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# BULLETIN

*of the*

## American Association of Petroleum Geologists

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### CONTENTS

Geologic History of Northern Mexico and Its Bearing on Petroleum Exploration	301
<i>By Lewis B. Kellum</i>	
GEOLOGICAL NOTES	
Field and Wildcat Developments in South Arkansas in 1942	326
<i>By B. W. Blanpied and Roy T. Hazzard</i>	
Field Developments in North Louisiana in 1942	333
<i>By B. W. Blanpied and Roy T. Hazzard</i>	
REVIEWS AND NEW PUBLICATIONS	
Hydrocarbons of the Uinta Basin of Utah and Colorado, by Clark F. Barb and James Ogden Ball	341
Recent Publications	341
THE ASSOCIATION ROUND TABLE	
Membership Applications Approved for Publication	343
Association Committees	344
Past and Present Officers of the Association	346
Association Membership List, March 3, 1944	347
Financial Statement for 1943	430
Financial Statement, Division of Paleontology and Mineralogy, for 1943	435
New Honorary Members	
Charles Newton Gould	440
William Embry Wrather	444
<i>By John L. Ferguson</i>	
<i>By Ellis W. Shuler</i>	
AT HOME AND ABROAD	
Current News and Personal Items of the Profession	446



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of the

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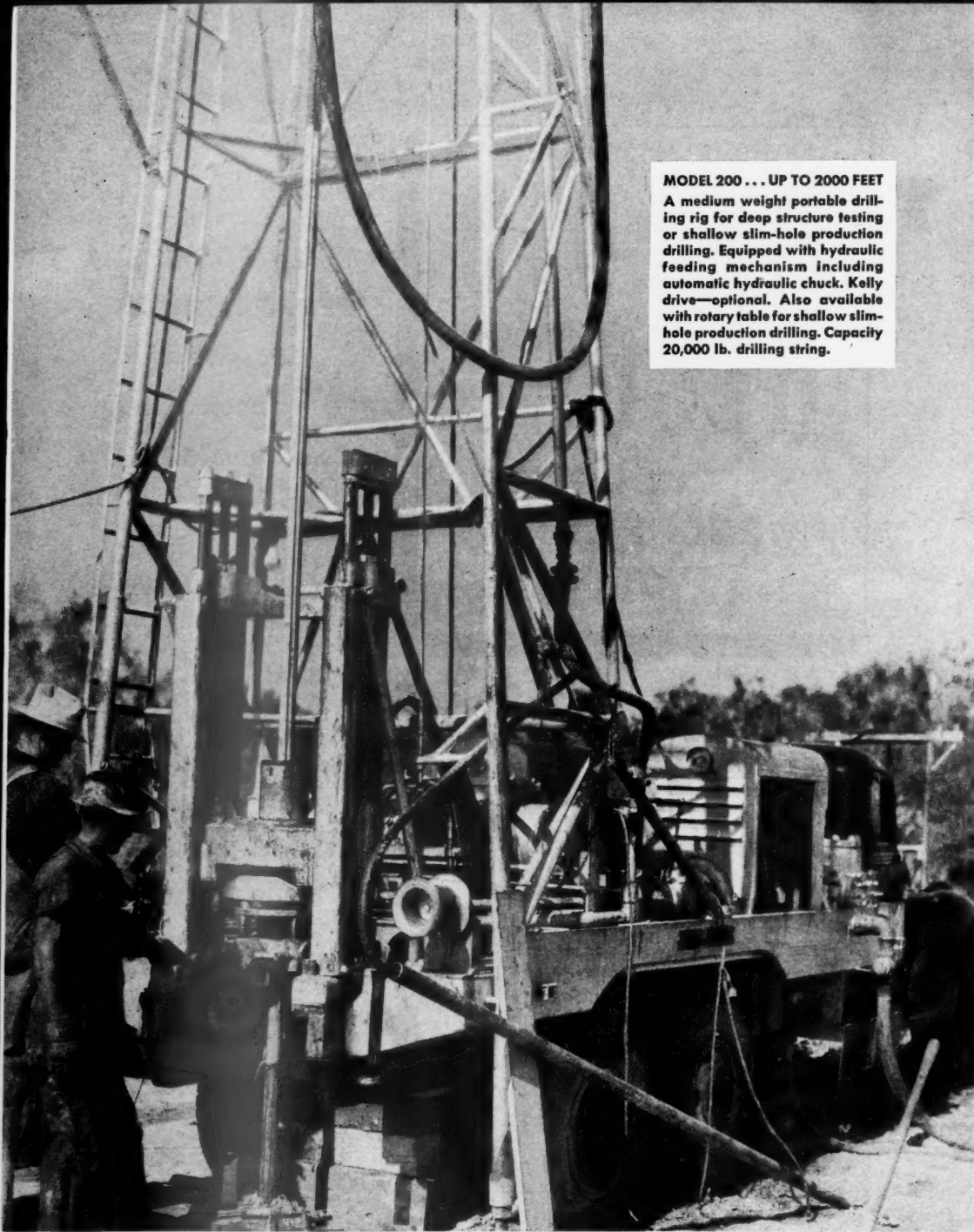
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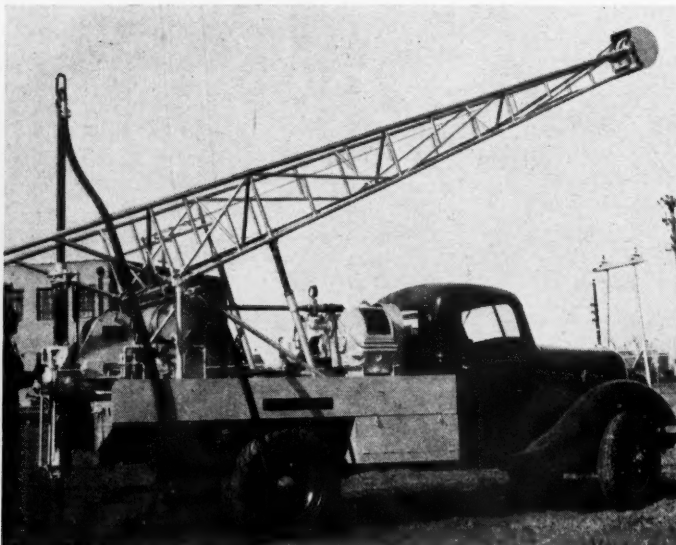
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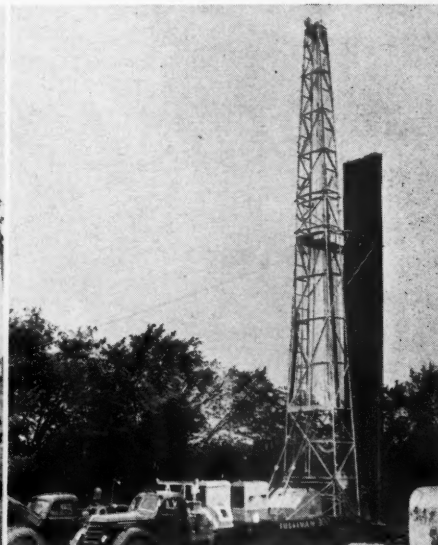
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Colorado .....	ix	New York .....	x	Texas .....	xi, xii, xiii
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Indiana .....	x	Oklahoma .....	x, xi	Wyoming .....	xiii

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Dallas .....	xv	Michigan .....	xiv	Shreveport .....	xiv
East Texas .....	xvi	Mississippi .....	xv	South Louisiana .....	xiv
Exploration Geophysicists ..	xvi	New Orleans .....	xiv	South Texas .....	xvi
Fort Worth .....	xvi	North Texas .....	xvi	Tulsa .....	xv
Houston .....	xvi			West Texas .....	xvi

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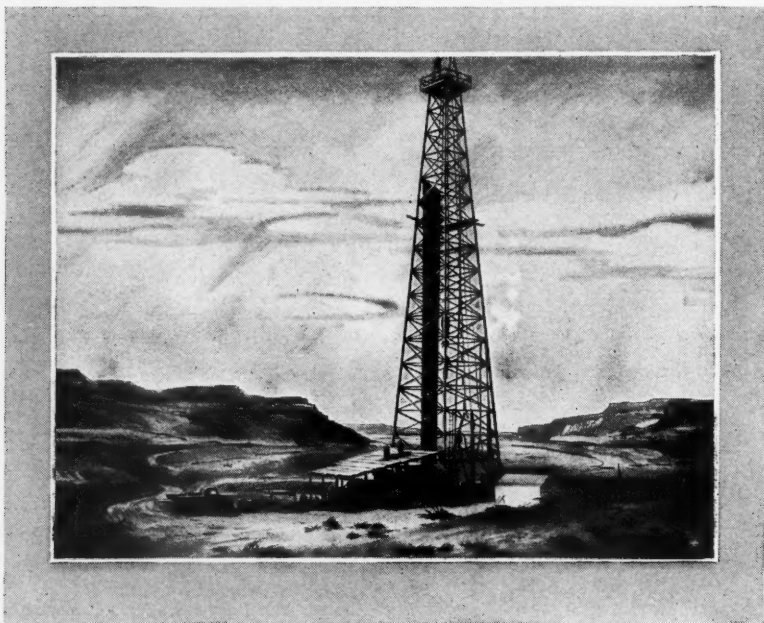
By NICHOLAS A. TALIAFERRO

### Correlation of Pecan Gap, Wolfe City, and Annona Formations in East Texas

By JOHN T. ROUSE

### "Corniferous" at Irvine, Estill County, Kentucky

By A. C. McFARLAN, L. B. FREEMAN, and V. E. NELSON



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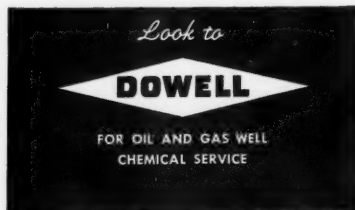
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PETROLEUM GEOLOGISTS**

MARCH, 1944

**GEOLOGIC HISTORY OF NORTHERN MEXICO AND ITS  
BEARING ON PETROLEUM EXPLORATION<sup>1</sup>**

LEWIS B. KELLUM<sup>2</sup>

Ann Arbor, Michigan

ABSTRACT

Buried platforms comparable with the Coahuila Peninsula of north-central Mexico are known to be present in several of the major downwarped areas in the central and coastal United States and beneath the coastal plain of eastern Mexico. It is believed that others may be present. The purpose of this paper is to point out certain criteria which may aid in their discovery.

A series of paleogeographic maps has been compiled to show the geologic development of Mexico during late Paleozoic and Mesozoic time. The stratigraphic section on the buried Coahuila Peninsula is in marked contrast to the deposits in the geosyncline on the south. This is due to the influence of the underlying massif on sedimentation throughout a long period of geologic time. It indicates that facies of deposition may be used as a guide in locating buried positive elements in the subsurface.

The influence of a buried massif on the structure of overlying strata is clearly demonstrated by the contrast between the relatively simple warping of Lower Cretaceous rocks over the Coahuila Peninsula and the tight, asymmetrical folding and overthrusting in the areas of the surrounding geosyncline. The physiography of the mountain ranges is an expression of the lithologic succession and geologic structure comprising them. Regionally it reveals the same contrast in underlying geology that marks the Coahuila Peninsula and the geosyncline. The area where great buried platforms, comparable with the Coahuila Peninsula, are likely to produce oil and gas in the future are the structurally downwarped provinces of the central United States and along the margins of the continent.

INTRODUCTION

Paleogeographic studies<sup>3</sup> in the Cordilleran Basin region of the United States, by numerous geologists during the past quarter century, have demonstrated the presence of several landmasses which stood as islands in the Paleozoic seas. One of these (the Front Range Highland) persisted until late Mesozoic time<sup>4</sup> and another (the Uinta element),<sup>5</sup> which foundered at about the same time, has its structural continuation eastward concealed beneath a blanket of Cretaceous and

<sup>1</sup> Manuscript received, July 2, 1943.

<sup>2</sup> Director, Museum of Paleontology, University of Michigan.

<sup>3</sup> Willis T. Lee, "Early Mesozoic Physiography of the Southern Rocky Mountains," *Smithsonian Misc. Coll.*, Vol. 69, No. 4 (1918).

F. A. Melton, "The Ancestral Rocky Mountains of Colorado and New Mexico," *Jour. Geology*, Vol. 33, No. 1 (1925), pp. 84-90.

T. S. Lovering and J. Harlan Johnson, "Meaning of Unconformities in Stratigraphy of Central Colorado," *Bull. Amer. Assoc. Petrol. Geol.*, Vol. 17, No. 4 (1933), pp. 353-74.

<sup>4</sup> T. S. Lovering and J. Harlan Johnson, *op. cit.* (1933), p. 373.

<sup>5</sup> W. A. VerWitte, "Ancestral Rocky Mountains," *Bull. Amer. Assoc. Petrol. Geol.*, Vol. 14, No. 6 (June, 1930), pp. 769, 773, 775.

Tertiary strata. Lovering<sup>6</sup> has shown the influence of the Front Range Highland on Mesozoic and Cenozoic sedimentation in central Colorado. Several land areas of considerable relief and extent were present in California and Oregon during Mesozoic time.<sup>7</sup> Their location is inferred from the lithology of sediments deposited in near-by troughs and basins to which they contributed large quantities of clastic sediments. The larger of these islands and peninsulas continued as positive elements of varying size and shape throughout the Tertiary.<sup>8</sup> Read and Hollister<sup>9</sup> concluded that the post-Jurassic structural evolution of southern California was dominated by the distribution of basement types. Sellards<sup>10</sup> observed that structural conditions on the Central Basin platform of West Texas, controlled to some degree the depositional facies in the Permian seas. In northern Mexico<sup>11</sup> also it has been shown that the underlying basement had a profound influence both on the type of sediments laid down and on the type of regional folding which took place in overlying beds during a later geologic period of orogeny. Location of these old landmasses by geologic studies on the surface and others by subsurface investigations suggests the probability that similar ancient massifs exist elsewhere concealed beneath a cover of later sediments.

The basic principles of the interrelation of stratigraphy and structure developed by recent studies in northern Mexico may find an application in any large basin of deposition. Buried platforms comparable with the Coahuila Peninsula of north-central Mexico<sup>12</sup> are known to be present in several of the major down-warped areas in the central and coastal United States and beneath the coastal plain of eastern Mexico. It is believed that others may be present. The purpose of this paper is to point out certain criteria which may aid in their discovery.

The Bellair-Champaign uplift<sup>13</sup> in the Eastern Interior coal basin and the Central Kansas uplift<sup>14</sup> in the Mid-Continent area are buried platforms similar in some respects to the Coahuila Peninsula. They were formerly peninsulas which projected southward into the Pennsylvanian seas just as the Coahuila Peninsula

<sup>6</sup> T. S. Lovering, "Geologic History of the Front Range, Colorado," *Proc. Colorado Sci. Soc.*, Vol. 12, No. 4 (1929), pp. 75 and 84-109.

<sup>7</sup> F. M. Anderson, "Lower Cretaceous Deposits in California and Oregon," *Geol. Soc. America Spec. Paper 16* (1938), pp. 11-17 and 87.

<sup>8</sup> R. D. Reed, *Geology of California* (Amer. Assoc. Petrol. Geol., 1933), pp. 250-54.

<sup>9</sup> R. D. Reed and J. S. Hollister, "Structural Evolution of Southern California," *Bull. Amer. Assoc. Petrol. Geol.*, Vol. 20, No. 12 (December, 1936), p. 1550.

<sup>10</sup> E. H. Sellards, "Structural Geology of Texas East of Pecos River," *Univ. Texas Bull.* 3401, Pt. I (January, 1934), p. 109.

<sup>11</sup> L. B. Kellum, R. W. Inlay, and W. G. Kane, "Relation of Structure, Stratigraphy and Igneous Activity to an Early Continental Margin," Evolution of the Coahuila Peninsula, Mexico, Part I, *Bull. Geol. Soc. America*, Vol. 47, No. 7 (1936), pp. 992-94, 1003, 1005-06.

<sup>12</sup> L. B. Kellum, "Paleogeography of Parts of Border Province of Mexico Adjacent to West Texas," *Bull. Amer. Assoc. Petrol. Geol.*, Vol. 20, No. 4 (April, 1936), pp. 419-22.

<sup>13</sup> L. A. Mylius, "Oil and Gas Development and Possibilities in East-Central Illinois," *Bull. Illinois Geol. Survey* 54 (1927), pp. 28, 30-31, Pls. I and XXI.

<sup>14</sup> L. C. Morgan, "Central Kansas Uplift," *Bull. Amer. Assoc. Petrol. Geol.*, Vol. 16, No. 5 (May, 1932), pp. 483-84.

projected southward into the Mesozoic seas. There is one important difference, however, in that the seas which surrounded the Bellair-Champaign uplift and the Central Kansas uplift were shelf seas whereas the seas which surrounded the Coahuila Peninsula were geosynclinal seas. This has made a great difference in the type of deformation which subsequently took place in the areas contiguous to the platforms.

The "Golden Lane" of the Mexican South fields<sup>15</sup> is probably the most spectacular oil district that has ever been discovered, the East Texas field<sup>16</sup> on the western edge of the Sabine uplift<sup>17</sup> is the largest oil pool so far developed, the Central Basin platform<sup>18</sup> in West Texas has produced many millions of barrels of oil. All are buried platforms which, like the Coahuila Peninsula, have influenced the character of deposition in overlying strata. The question which faces Gulf Coast geologists to-day is "Where are we going to find another of these great platforms which has controlled the distribution and accumulation of oil and gas?"

#### PALEOGEOGRAPHIC DEVELOPMENT

Every paleogeographic map is to some extent a composite picture of continuously changing shorelines. The faithfulness with which a given map portrays the true distribution of land and sea depends to a considerable degree on the brevity of the time interval selected for representation by the paleocartographer. The longer the interval the more generalized will be the resulting map; the shorter the interval the more limited are the available data. A compromise on a period of time long enough to furnish a wide distribution of localities and yet short enough to exclude more than one major transgression or regression of the sea is likely to yield a picture more nearly approaching the true appearance of the earth's surface at any time.

The sequence of events in the geologic history of northern Mexico is integrated with the geologic development of the oil-bearing regions of Texas and eastern Mexico. The mountainous region was the source of much of the clastic sediment deposited during Mesozoic and Cenozoic time in the oil- and gas-producing areas of the Gulf Coastal Plain. A series of paleogeographic maps have been compiled to show the geologic development of Mexico. Data for the earlier periods of the Paleozoic are too meager to permit an attempt to reconstruct the distribution of land and sea before Permian time.

<sup>15</sup> J. M. Muir, *Geology of the Tampico Region, Mexico* (Amer. Assoc. Petrol. Geol., 1936), pp. 203-25.

R. Leibensperger, "The Mexican Oil Fields," *The Lamp* (August, 1922), pp. 10-19.

<sup>16</sup> H. E. Minor and M. A. Hanna, "East Texas Oil Field, Rusk, Cherokee, Smith, Gregg, and Upshur Counties, Texas," *Stratigraphic Type Oil Fields* (Amer. Assoc. Petrol. Geol., 1941), pp. 600-60.

<sup>17</sup> E. H. Sellards, "Structural Geology of Texas East of Pecos River," *Univ. Texas Bull.* 3401 (January, 1934), pp. 45-48.

<sup>18</sup> *Ibid.*, pp. 106-10.

R. E. King *et al.*, "Resumé of Geology of the South Permian Basin, Texas and New Mexico," *Bull. Geol. Soc. America*, Vol. 53, No. 4 (April, 1942), pp. 539-60.



Cambrian strata, reported only from the Cabullona region in northeastern Sonora, is thought by N. L. Taliaferro<sup>19</sup> who studied the area, to comprise a southward extension of the Balsa quartzite and the Abrigo limestone of Arizona. Upper Ordovician limestone, known from two localities in central Sonora<sup>20</sup> has a thickness of 50 meters and bears a coral fauna of Richmond age correlated with the Montoya limestone of the El Paso region. Rocks of the Silurian have not been recognized anywhere in Mexico. The Upper Devonian Marine limestone of Arizona is thought by Taliaferro<sup>21</sup> to extend southward into the Musteñas Mountains of the Cabullona area. Strata of Lower Mississippian age are reported from three widely spaced localities: (1) the Escabrosa limestone at Cabullona,<sup>22</sup> (2) brachiopod-bearing limestone in the Sierra de Teras of northern Sonora,<sup>23</sup> and (3) brachiopod-bearing shales at Peregrina Canyon<sup>24</sup> in Tamaulipas. Fossiliferous strata of Pennsylvanian age are more widely distributed and better known than earlier Paleozoic formations. The Pennsylvanian is represented in the Cabullona area<sup>25</sup> by the Naco limestone (2,500 feet thick) which includes both Pennsylvanian and Permian horizons; in the Huchita Hueca Mountains<sup>26</sup> southeast of the Cabullona basin in northern Sonora, R. W. Imlay found 300 meters of limestone with fusulines comparable with the Cisco in the lower part and Leonard fusulines 30 meters below the top. C. L. Baker<sup>27</sup> has described the Caborca group of Pennsylvanian age in the Altar region of northwestern Sonora; at Las Delicias in southern Coahuila Pennsylvanian shales and limestones have been described by R. E. King.<sup>28</sup>

Permian limestones are widely distributed in Sonora. Fusulines of Leonard age from Sonora studied by C. O. Dunbar,<sup>29</sup> have nothing in common with those from West Texas and the Las Delicias area. A western sea apparently invading southward from Arizona into Sonora, was separated by a land area from an east-

<sup>19</sup> N. L. Taliaferro, "An Occurrence of Upper Cretaceous Sediments in Northern Sonora, Mexico," *Jour. Geol.*, Vol. 41, No. 1 (January-February, 1933), pp. 16-18.

<sup>20</sup> R. E. King, "Geological Reconnaissance in Northern Sierra Madre Occidental of Mexico," *Bull. Geol. Soc. America*, Vol. 50, No. 11 (November, 1939), pp. 1641 and 1643.

<sup>21</sup> N. L. Taliaferro, *op. cit.*, pp. 16 and 18.

<sup>22</sup> *Ibid.*, p. 16.

<sup>23</sup> R. W. Imlay, "Paleogeographic Studies in Northeastern Sonora," *Bull. Geol. Soc. America*, Vol. 50, No. 11 (November, 1939), pp. 1730-32.

<sup>24</sup> G. H. Girty, "A New Area of Carboniferous Rocks in Mexico," *Science*, N. S., Vol. 63, No. 1628 (March, 1926), pp. 286-87.

<sup>25</sup> N. L. Taliaferro, *op. cit.*, pp. 16, 18-19.

<sup>26</sup> R. W. Imlay, *op. cit.* (1939), pp. 1732-33.

<sup>27</sup> Charles Schuchert, *Historical Geology of the Antillean-Caribbean Region*, New York (1935), pp. 137-38.

<sup>28</sup> R. E. King, "Paleozoic Stratigraphy of Mexico," *Proc. 8th Amer. Sci. Cong.*, Vol. IV (May 1940), pp. 112-14.

<sup>29</sup> C. O. Dunbar, "Permian Fusulines from Sonora," *Bull. Geol. Soc. America*, Vol. 50, No. 11 (November, 1939), pp. 1745-47.



ern sea in western Texas which extended southward into Coahuila and thence southeastward across Tamaulipas connecting with the Gulf of Mexico (Fig. 1). R. E. King<sup>30</sup> who studied the Permian of West Texas and also of the Las Delicias area considers that the Las Delicias Permian was laid down in the southern continuation of the Texas Permian geosyncline. Marine Upper Triassic deposits are known in western Sonora<sup>31</sup> and Zacatecas (Fig. 2).<sup>32</sup> The faunas on opposite sides of the continent, although of the same age and having Mediterranean affinities, represent quite different facies. It seems unlikely that they had a direct marine connection. Probably an epeiric sea from the Gulf of Mexico invaded westward as far as Zacatecas for a short time during the Carnic stage while in Sonora an epi-continental sea from the west overlapped the margin of the present land area. The Carnic fauna in northwestern Sonora is closely related to the fauna which lived in California and Nevada at that time. Its Mediterranean element probably entered the Pacific by way of the Panama portal, migrated northward along the shoreline and into epeiric embayments such as that which invaded the Great Basin region. The Upper Triassic faunas of Sonora occur in limestone stringers in the lower part of the Barranca formation<sup>33</sup> which is composed chiefly of fresh- and brackish-water clastic rocks, containing beds of coal and graphite. This eastward penetration of the sea marks the beginning of a marine portal in northern Sonora which may have connected the Pacific with the Mexican geosyncline at several stages of the Jurassic and Cretaceous.<sup>34</sup>

By Lower Jurassic time the sea had withdrawn from Zacatecas and a new invasion had begun farther south in the Huasteca of Hidalgo, Puebla, and Vera Cruz (Fig. 3). In this downwarped area accumulated continental deposits with marine wedges from the Gulf of Mexico penetrating progressively farther west. A monograph prepared by C. Burckhardt on the paleontology and stratigraphy of this embayment is in press.<sup>35</sup> In northern Sonora the western sea had developed a larger reëntrant into a subsiding trough. Continental deposits of the Barranca formation continued to accumulate here, submerged from time to time, as repeated downwarping permitted the marine waters to invade eastward. Lime-

<sup>30</sup> R. E. King, "Permian of Southwestern Coahuila," *Amer. Jour. Sci.*, 5th Ser., Vol. 27, No. 158 (February, 1934), p. 108.

<sup>31</sup> C. Burckhardt, "Etude synthétique sur le Mésozoïque Mexicain," *Mém. Soc. Paléont. Suisse*, Vol. 49, No. 4 (1930), p. 6.

<sup>32</sup> C. Burckhardt, "La Faune Marine du Trias Supérieur de Zacatecas," *Bol. Inst. Geol. de México*, No. 21 (1905), pp. 1-41.

<sup>33</sup> R. E. King, "Geological Reconnaissance in Northern Sierra Madre Occidental of Mexico," *Bull. Geol. Soc. America*, Vol. 50, No. 11 (November, 1939), pp. 1645, 1655, 1657.

<sup>34</sup> L. B. Kellum, R. W. Imlay, and W. G. Kane, "Relation of Structure, Stratigraphy, and Igneous Activity to an Early Continental Margin," Evolution of the Coahuila Peninsula, Part I, *Bull. Geol. Soc. America*, Vol. 47, No. 7 (July, 1936), pp. 981-83.

See also: R. W. Imlay, "Possible Inter-oceanic Connections across Mexico during the Jurassic and Cretaceous Periods," *Proc. 6th Pac. Cong.* (1939), pp. 423-27.

<sup>35</sup> C. Burckhardt, "Etude synthétique sur le Mésozoïque Mexicain," *Mém. de la Soc. Paleont. Suisse*, Vol. 49 (1930), p. 8.



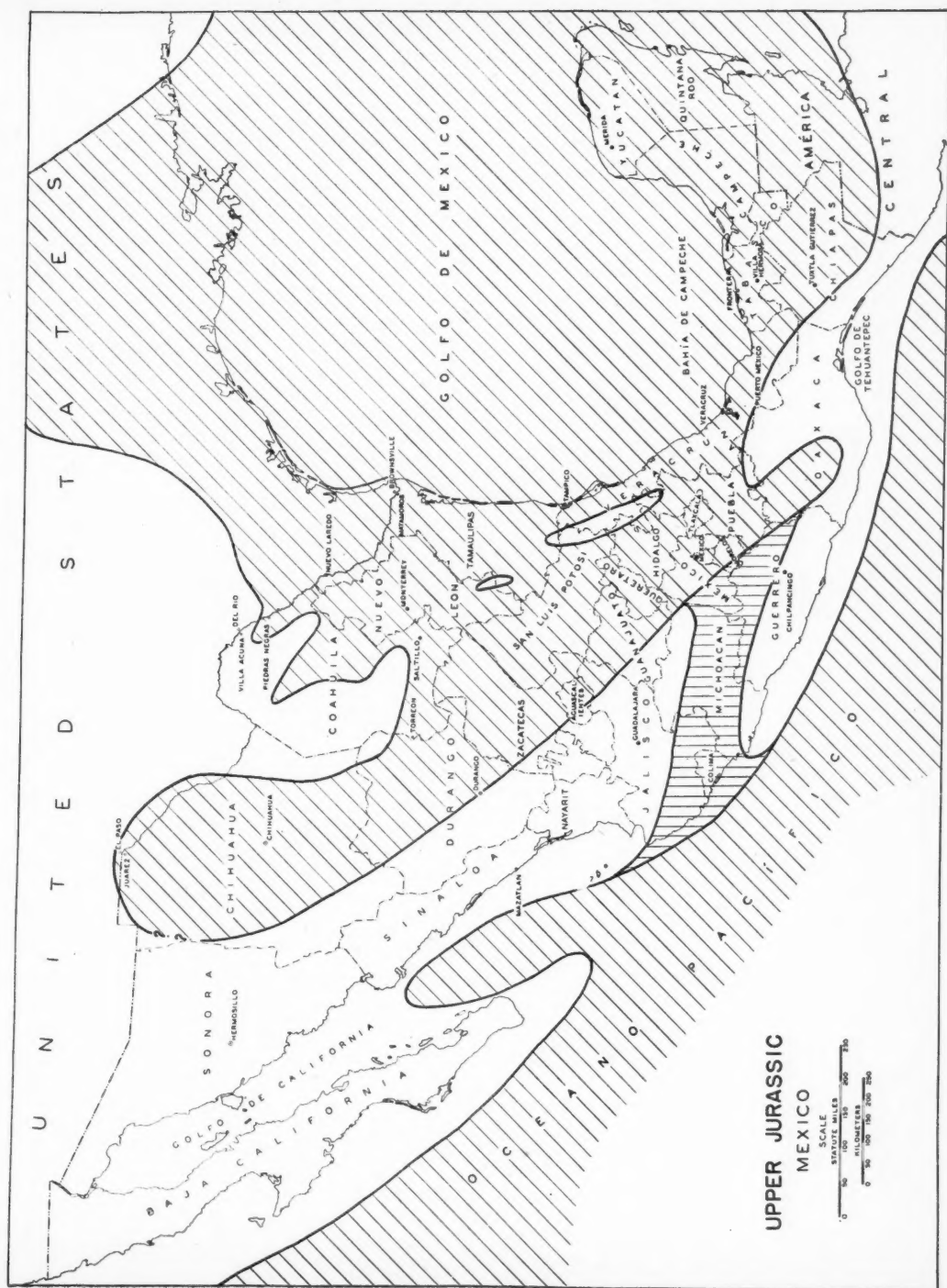


FIG. 4



stones bearing Lower Jurassic marine fossils are present in the upper part of the Barranca formation.<sup>36</sup>

After Lower Jurassic time the seas spread rapidly from the area of their initial invasion of the Huasteca region. By Upper Jurassic they had filled the Mexican geosyncline and extended northward beyond the Rio Grande into West Texas at least as far as the Malone Mountains (Fig. 4). Their limit to the northwest is only vaguely known and further study may show that waters were present in the northern Sonoran portal at this time. From the Big Bend region of Texas a peninsula extended southward across western Coahuila and eastern Chihuahua as far as the Parras basin in southern Coahuila.<sup>37</sup> Its mountainous topography is indicated by the coarse clastics contributed to the marginal seas adjoining it on three sides during Upper Jurassic and Lower Cretaceous (Neocomian) time. Northeast of the Coahuila Peninsula there is evidence of a smaller promontory projecting southeastward into the sea along the site of the Burro Mountains and their structural continuation, the Peyotes Hills and the Chancaca structure. The southeastern limit of this promontory is not known but it probably terminated before reaching the state line of Nuevo Leon where a well drilled by the Gulf Oil Company on the Escalera arch (southeast continuation of the Chancaca structure) in 1934 was reported to have encountered marine Jurassic strata from about 8,700 to 9,160 feet.<sup>38</sup> A third promontory that may have influenced the position of the Upper Jurassic shoreline along the Rio Grande is indicated by data from the Ohio-Mexico Oil Company's Zambrano well, drilled in 1927 about 45 miles west of Villa Acuña, which started very near the top of the Georgetown limestone and went into granite wash at 3,200 feet. This well was located on a long prominent anticline that apparently is underlain by a granite ridge. It crosses the Rio Grande at a point 4 kilometers downstream from Jimenez, where its continuation to the southeast in Maverick County is known as the Chittim anticline. The shoreline of the Upper Cretaceous sea presumably passes around the nose of this feature and thence strikes northeast and north across central Texas to its known continuation in southern Arkansas. In southern Mexico the Mexican geosyncline was from time to time connected with the Pacific Ocean by the Balsas portal.<sup>39</sup> The presence of this strait is indicated by the thick marine sections, and steep folding in the mountainous belt of Michoacan, Jalisco and Colima north of the Sierra Madre del Sur which strikes east and west. This region has not been

<sup>36</sup> R. E. King, "Geological Reconnaissance in Northern Sierra Madre Occidental of Mexico," *Bull. Geol. Soc. America*, Vol. 50, No. 11 (November, 1939), pp. 1645, 1655, 1657, 1658.

E. Jaworski, "Eine Lias-Fauna aus Nordwest-Mexiko," *Agh. Schweiz. Palaeont. Gesellschaft*, Bd. 48, No. 4 (1929), pp. 1-12.

<sup>37</sup> L. B. Kellum, "Paleogeography of Parts of Border Province of Mexico Adjacent to West Texas," *Bull. Amer. Assoc. Petrol. Geol.*, Vol. 20, No. 4 (April, 1936), pp. 418-22.

<sup>38</sup> F. K. G. Müllerried, "Neue Funde in Jura und Kreide Ost- und Süd-Mexicos," *Eclogae Geologicae Helveticae*, Vol. 29, No. 2 (1936), p. 314.

<sup>39</sup> Charles Schuchert, *Historical Geology of the Antillean-Caribbean Region*, New York (1935), pp. 28, 150.



studied in detail and the stages when this portal was open and closed are not definitely known.<sup>40</sup>

During Lower Cretaceous time the seas continued to spread. Their encroachment caused the marginal landmasses to shrink in size. In the northwest the waters persisted beyond the Rio Grande into the Malone Mountain region of western Texas and extended into northeastern Sonora (Fig. 5). The Coahuila Peninsula was smaller in size than during the late Jurassic and probably the two promontories to the northeast of it were also smaller. The Balsas portal in the southwest appears to have been open during certain stages of the Neocomian. The Pacific waters spread eastward across western Sonora from the Gulf of California. By Albian (Lower Cretaceous) time marine waters covered most of Mexico (Fig. 6). A considerably shrunken landmass persisted in western Mexico surrounded by the sea. North of it the northern Sonoran portal was open connecting the Mexican geosynclinal sea with the Gulf of California. At the west lay the Gulf of California and the Pacific Ocean. To the southeast it was cut off by waters which filled the Balsas portal. The Coahuila Peninsula was first submerged in upper Aptian time and subsequently subsided so slowly that its surface remained at sea-level for a long period while lagoonal deposits accumulated to a thickness of 1,500 feet.<sup>41</sup> By mid-Albian time it formed a submerged bank teeming with rudistids and foraminifera.<sup>42</sup>

The seas continued to transgress northward from the Mexican geosyncline and the Gulf of Mexico and reached their maximum extent over the North American Continent in Turonian (Benton) time. Then they subsided during the remainder of the Upper Cretaceous except in downwarped embayments such as the Ojinaga basin of northeastern Chihuahua, the Muzquiz coal basin of northeastern Coahuila, the Parras basin of southern Coahuila, and the Cardenas area of San Luis Potosí. In the Parras basin accumulated 12,000 feet of shallow-water sandstones and shales during the Campanian stage alone.<sup>43</sup> This basin must have subsided at least 20,000 feet after the close of the Lower Cretaceous when it was differentiated from the rest of the Mexican geosyncline south of the Coahuila Peninsula. Broad warping of the continent in Upper Cretaceous time marked the beginning of the Laramide revolution which reached its maximum intensity after Maestrichtian time and continued with decreasing vigor in the early Tertiary.

<sup>40</sup> R. W. Imlay, "Possible Interoceanic Connections across Mexico during the Jurassic and Cretaceous Periods," *Proc. 6th Pac. Sci. Cong.* (1939), pp. 423-27.

<sup>41</sup> W. A. Kelly, "Geology of the Mountains Bordering the Valleys of Acatita and Las Delicias," Evolution of the Coahuila Peninsula, Mexico, Part II, *Bull. Geol. Soc. America*, Vol. 47, No. 7 (July, 1936), pp. 1024-27.

<sup>42</sup> *Ibid.*, pp. 1027-28.

<sup>43</sup> R. W. Imlay, "Stratigraphy and Paleontology of the Upper Cretaceous Beds along the Eastern Side of Laguna de Mayran, Coahuila, Mexico," *Bull. Geol. Soc. America*, Vol. 48, No. 12 (December 1937), p. 1800.

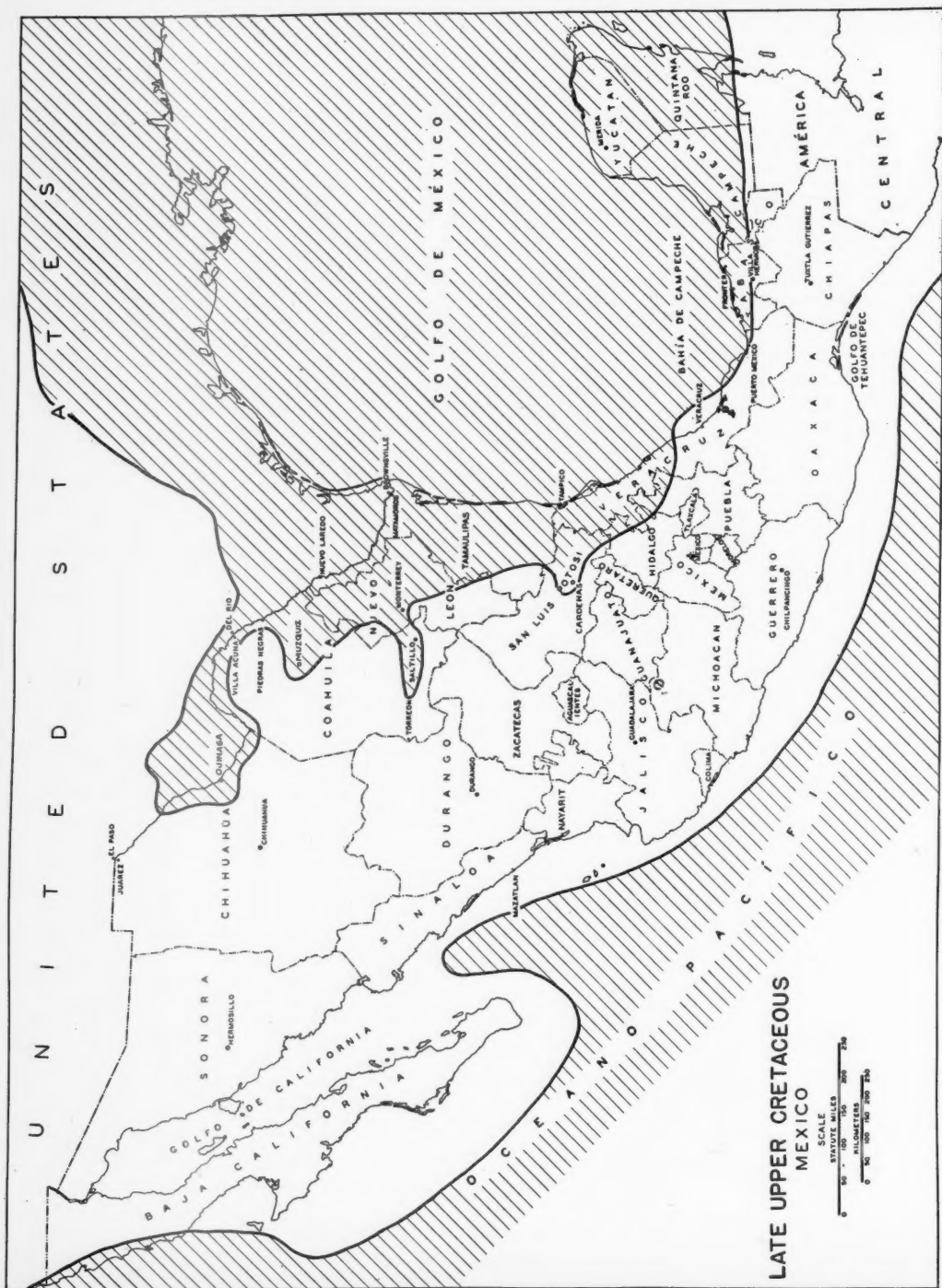


FIG. 7

## PETROLIFEROUS AREAS

The major oil fields of Mexico are situated on the Gulf Coastal Plain in the state of Vera Cruz between Tampico and Tuxpan. They belong to two groups: the Northern oil fields center along the Panuco River southwest of Tampico; and the South fields extend in an arc northward from the Tuxpan River for 51 miles to Dos Bocas on the coast. The formations penetrated by wells in these fields crop out in the coastal plain on the west or in the front range of the Sierra Madre Oriental. Most of the production in both areas comes from Lower Cretaceous limestones. In the northern fields the main producing formation is designated the Tamaulipas limestone<sup>44</sup> from Sierra Tamaulipas which lies at the north and trends northward parallel with the coast. It is white, light gray, or brown in color and has a dense almost lithographic texture. Oil accumulation has taken place along joints, faults, or fracture zones crossing a broadly domed area. In the South fields the main producing formation is designated the El Abra limestone from the Sierra del Abra which is the front range of the Sierra Madre Oriental.<sup>45</sup> It is coarsely crystalline white limestone made up largely of rudistid shells and the tests of miliolid foraminifera. The same facies forms the Sierra del Abra and is widely distributed over the Coahuila Peninsula in north-central Mexico. In the South fields it forms a buried fault block tilted east with oil accumulation along its higher western rim. The productive width is about 1 kilometer. Wells drilled a short distance west of the crest indicated a sharp drop-off but wells east of the crest showed a relatively gentle slope of the El Abra limestone. The geologic history of this buried ridge is similar to that of the Sierra del Abra<sup>46</sup> which forms a topographic ridge on the present land surface at the west side of the Tampico embayment. Both have an arcuate ground plan and lie on opposite sides of a depressed block with their steep convex side facing it. The El Abra limestone is clearly a reef limestone formed during Lower Cretaceous time on the shallow submarine banks of uplifted fault blocks. Between the two blocks a bathyal limestone facies was forming at the same time. It is the Tamaulipas limestone penetrated in the Northern oil fields.

## STRATIGRAPHY AND STRUCTURE OF NORTHERN MEXICO

## GEOLOGIC PROVINCES

Six physiographic and structural provinces present in northern Mexico are, with one exception, the southward continuation of provinces in the United States (Fig. 8).<sup>47</sup> On the east, bordering the Gulf of Mexico, is the coastal plain under-

<sup>44</sup> J. M. Muir, *op. cit.* (1936), pp. 23-36.

<sup>45</sup> *Ibid.*, pp. 38-43.

<sup>46</sup> L. B. Kellum, "Similarity of Surface Geology in Front Range of Sierra Madre Oriental to Sub-surface in Mexican South Fields," *Bull. Amer. Assoc. Petrol. Geol.*, Vol. 14, No. 1 (January, 1930), pp. 73-91.

<sup>47</sup> N. M. Fenneman, "Physical Divisions of the United States." Map issued by the U. S. Geol. Survey.

E. Ordoñez, "Principal Physiographic Provinces of Mexico," *Bull. Amer. Assoc. Petrol. Geol.*, Vol. 20, No. 10 (October, 1936), pp. 1277-1307.



lain by gently folded Cretaceous and Cenozoic rocks. This is modified by isolated mountains or ranges of sedimentary and igneous rocks which rise above the general level of the plain to elevations locally of 4,000 feet or more. This relatively narrow province in Mexico is the southward continuation of both the Gulf Coastal Plain province and the Great Plains province in the United States. It is bordered on the west by the Sierra Madre Oriental, a belt of steeply folded Cretaceous limestone mountains which comprise the eastern margin of the Plateau Central province. The Sierra Madre Oriental and the Plateau Central together form the extension into Mexico of the Great Basin section of the Basin-and-Range province. The Plateau Central is made up largely of isolated mountain ranges of Cretaceous and Jurassic rocks separated by broad intermontane, alluvium-covered plains. Tertiary lavas are locally present as hills and low ridges within the intermontane valleys. From the western margin of the Gulf Coastal Plain to the floor of the broad valleys on the Plateau Central there is a rise of about 3,500 feet. The Plateau Central province is bounded on the west by the Sierra Madre Occidental, a lofty mountain range of about 7,000 feet average elevation, composed of Tertiary lavas.<sup>48</sup> Molten rocks poured out and buried the mountains and plains along the western side of the Plateau Central. Streams have since cut deep gorges through the nearly horizontal lavas, exposing the folded Mesozoic rocks beneath. At the northwest is the Sonoran Desert province extending from the state of Sonora into Arizona and southeastern California. Here erosion remnants of Paleozoic sedimentary and igneous rocks form island-like mountain ranges of the basin-and-range type, in the midst of great sandy wastes. This topography disappears toward the southeast beneath the lavas of the Sierra Madre which in mid-Tertiary time flowed into the southern part of the Sonoran Desert. West of it is the Gulf of California, a great down-dropped block which separates the peninsula of Lower California almost completely from the rest of Mexico. Lower California is a positive block comparable in structure and geologic history to the Sierra Nevada and Coast ranges. Intrusion of the batholiths, however, may have taken place in Lower Cretaceous time.<sup>49</sup>

Intimate knowledge of the geologic history of northern Mexico has been gained by mapping numerous mountain ranges in Coahuila, Durango, Zacatecas, and Tamaulipas.

#### SAN CARLOS MOUNTAINS, TAMAULIPAS

Llanoria, the old landmass which occupied parts of Arkansas, Oklahoma, Louisiana, eastern Texas, and Mexico during most of the Paleozoic, became an active positive element in late Mississippian, Pennsylvanian, and Permian time.<sup>50</sup> Subsequently, it foundered during the Mesozoic but all of the land was not sub-

<sup>48</sup> E. Ordoñez, *op. cit.*, pp. 1285-87.

<sup>49</sup> P. B. King, "Tectonics of Northern Mexico," *Proc. 8th Amer. Sci. Cong.*, Vol. 4 (1940), p. 395.

<sup>50</sup> Charles Schuchert, *op. cit.* (1935), pp. 240-41.

C. Schuchert and C. O. Dunbar, *Historical Geology*, New York (1933), p. 280.

merged simultaneously. By Upper Jurassic time and possibly earlier, that part of Llanoria which extended into eastern Mexico had sunk beneath the sea. W. H. Hegwein discovered Upper Jurassic and Neocomian fossils in the Tamaulipas limestone of the San Carlos Mountains.<sup>51</sup> Nevertheless, the influence of Llanoria is seen in the structure and lithology of Cretaceous and Jurassic sediments of the Gulf Coastal Plain. The Tamaulipas limestone appears to have been deposited in deep water, far from a source of clastic sediments, but not under geosynclinal conditions. In the coastal plain it did not undergo the intense deformation during the Laramide revolution which characterized the area farther west in the Sierra Madre Oriental and in part of the Plateau Central. Apparently the old land of Llanoria, although deeply submerged, acted as a buttress resisting the horizontal compression which crumpled the true geosynclines marginal to it.

An example of the stratigraphic and structural conditions which developed on Llanoria after its submergence is seen in the San Carlos Mountains in west-central Tamaulipas.<sup>52</sup> It is an isolated range rising out of the coastal plain about midway between the Sierra Madre front and the Gulf Coast. It is at the north end of the Sierra Tamaulipas and separated from it by a broad saddle known as the Mesa de Solis. Mapping of the San Carlos Mountains was undertaken originally in connection with the oil possibilities of northeastern Mexico. The range is in the transition zone between the Tampico embayment and the Rio Grande embayment and its study has thrown some light on the problems of both areas.

The structure of the San Carlos Mountains is primarily a broad, low dome with two distinct types of secondary folding superimposed on it. The first is a series of gentle, parallel flexures trending eastward across the entire range. The second comprises a group of laccolithic intrusions of varying size which have domed the Cretaceous limestones in many parts of the mountains. Dikes radiate from the larger of these intrusions even beyond the margins of the range. That the folding of the anticlinal flexures preceded the igneous intrusions is indicated by the fact that the axes are not deflected as they approach the intrusions but head directly into them and terminate abruptly at the steeply tilted limestones of the domes.

#### VARIATION IN COLOR OF TAMAULIPAS LIMESTONE

The Tamaulipas limestone in the northern oil fields near Tampico, and also in the Sierra Tamaulipas, north of there, has a white to light gray or brown color. In the Sierra Madre Oriental, however, it is black or dark blue. This color change is thought to be of some significance since no oil has ever been found in the black or dark blue facies.

The San Carlos Mountains are much wider than the Sierra Tamaulipas and

<sup>51</sup> Carlos Burckhardt, *op. cit.* (1930), p. 266.

<sup>52</sup> L. B. Kellum *et al.*, "The Geology and Biology of the San Carlos Mountains, Tamaulipas, Mexico," *Univ. Michigan Studies, Sci. Ser.*, Vol. 12 (1937), 341 pp.

therefore afford an opportunity to study outcrops of the Tamaulipas limestone in a wider area east and west than is possible elsewhere east of the Sierra Madre front. Also they extend farther west and approach closer to the outcrops of Tamaulipas limestone in the Sierra Madre. It was observed that the limestone on the eastern side of the San Carlos Mountains is the same white or light gray dense facies that occurs in the Sierra Tamaulipas but that on the western side it is black or dark blue similar to the facies in the Sierra Madre Oriental. As one goes from east to west across the range it is noted that the white limestone becomes splotted with black color which increases in proportion westward until the limestone is all black.

On the eastern side wherever an igneous dike cuts the white limestone, the color is changed to black in a narrow zone immediately adjacent to the face of the dike. An inch or less from it the limestone is splotted black and white and a few inches away is entirely white. Also around the nephelite syenite intrusion at El Patado the limestone is black near the igneous contact and becomes white a short distance away from it. In the western part of the range where black limestone predominates, igneous activity is much more widespread. This suggests that the dark color of the limestone is the result of igneous metamorphism.

In the Sierra Madre Oriental, however, 40 miles west of the San Carlos Mountains, there is essentially no igneous activity and hence the dark color of the Tamaulipas limestone of that area can not be due to igneous metamorphism. It is, however, correlated with another striking geologic difference between that range and the Sierra Tamaulipas. In the Sierra Madre Oriental the limestone is intensely folded into sharp anticlines and synclines, whereas in the Sierra Tamaulipas it forms a broad, gently uplifted arch. This contrast in structure as well as in color suggests that the dark color of the Tamaulipas limestone in the Sierra Madre Oriental may be the result of regional metamorphism.

Dark color in limestone and shales is usually attributed to the presence of organic matter if dark colored minerals are not present to account for it. This is undoubtedly true but there is some evidence to suggest that the dark color may be due to the chemical condition of the organic matter rather than to its abundance. In El Abra quarry of the Sierra del Abra,<sup>53</sup> west of Tampico, white crystalline limestone is very porous due to the abundance of rudistid fossils and to geodes. When freshly broken with the hammer a volatile, colorless oil runs out of the cavities and pore spaces. Here, therefore, the limestone contains an abundance of hydrocarbons but its color is white. Perhaps the heat of igneous metamorphism, or that generated by regional metamorphism, may cause a change in the chemical composition of the hydrocarbons resulting in the deposition of pure carbon or of some black hydrocarbon.

#### MAJOR ZONE OF CROSS-FOLDING

Regional studies have shown that the San Carlos Mountains with their east-

<sup>53</sup> J. M. Muir, *op. cit.*, p. 38.

ward-trending flexures are situated in a major zone of east-west folding traced for 200 miles from central Tamaulipas across Nuevo León, southern Coahuila, and northern Zacatecas to eastern Durango. This zone is about 25 miles wide, extends to the approximate center of the continent, and is a conspicuous feature in the structural plan of Mexico. Its origin and geologic history are closely related to the Coahuila Peninsula, another major structural element, lying north of it.

At the west end of this great zone of cross-folding is the Sierra de Jimulco,<sup>54</sup> a high and rugged mountain knot. Highly fossiliferous marine Upper Jurassic and Cretaceous limestones, shales and sandstones are intensely folded into isoclinal folds whose axes incline at a steep angle to the south. Within this range the belt of east-west cross-folding passes into the normal northwest Rocky Mountain trend by a series of sharp bends, that is, horizontal buckling of the axes, which serve to accommodate the great mass of rock involved on the inside of the angle.

#### MEXICAN GEOSYNCLINE

The geologic history of the geosyncline south of the Coahuila Peninsula has been studied in numerous other mountain ranges of eastern Durango, southern Coahuila and northern Zacatecas.<sup>55</sup> There we find continental Triassic (?) red-beds overlain by thick sections of marine Upper Jurassic and Cretaceous sediments intensely folded into steep anticlines and synclines, many of which are isoclinal. Locally fan folds are present and elsewhere thrust faulting has been recognized locally.

<sup>54</sup> L. B. Kellum, "Reconnaissance Studies in the Sierra de Jimulco, Mexico," *Bull. Geol. Soc. America*, Vol. 43, No. 3 (September, 1932), pp. 541-64.

<sup>55</sup> Carlos Burckhardt, "La Faune Jurassique de Mazapil, avec un appendice sur les Fossiles du Cretacique inferieur," *Bol. Inst. Geol. de Mexico*, Nu. 23 (1906), pp. 1-40.

—, "Géologie de la Sierra de Concepción del Oro (Mexico)," *10th Intern. Geol. Cong., Mexico*, Guidebook 24 (1906), pp. 1-24.

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—, "Estudio geológico de la región de San Pedro del Gallo, Durango," *Parergones Inst. Geol. Mexico*, Tomo III, No. 6 (1910), pp. 397-57.

—, "Faunes Jurassiques et Cretaciques de San Pedro del Gallo (État de Durango, Mexico)," *Bol. Inst. Geol. de Mexico*, Nu. 29 (1912), pp. 1-260.

—, "Faunas Jurásicas de Symon (Zacatecas) y Faunas Cretácicas de Zumpango del Rio (Guerrero)," *Bol. Inst. Geol. de Mexico*, Nu. 33 (1919), pp. 1-135.

Emil Böse, "Algunas Faunas Cretácicas de Zacatecas, Durango y Guerrero," *Bol. Soc. Geol. Mexico*, Nu. 42 (1923), pp. 1-219.

Carlos Burckhardt, "Faunas del Aptiano de Nazas (Durango)," *Bol. Inst. Geol. de Mexico*, Nu. 45 (1925), pp. 1-71.

R. W. Imlay, "Geology of the Western Part of the Sierra de Parras," Evolution of the Coahuila Peninsula, Mexico, Part IV, *Bull. Geol. Soc. America*, Vol. 47, No. 7 (July, 1936), pp. 1091-1152.

L. B. Kellum, "Geology of the Mountains West of the Laguna District," Evolution of the Coahuila Peninsula, Mexico, Part III, *ibid.*, pp. 1039-90.

Q. D. Singewald, "Igneous Phenomena and Geologic Structure near Mapimi," Evolution of the Coahuila Peninsula, Mexico, Part V, *ibid.*, pp. 1153-76.

R. W. Imlay, "Geology of the Middle Part of the Sierra de Parras, Coahuila, Mexico," *ibid.*, Vol. 48, No. 5 (May, 1937), pp. 587-630.

T. S. Jones, "Geology of Sierra de la Peña and Paleontology of the Indidura Formation, Coahuila, Mexico," *ibid.*, Vol. 49, No. 1 (January, 1938), pp. 69-150.

R. W. Imlay, "Studies of the Mexican Geosyncline," *ibid.*, Vol. 49, No. 11 (November, 1938), pp. 1651-94.

## COAHUILA PENINSULA

Stratigraphic and structural conditions on the Coahuila Peninsula have been studied in the Las Delicias area<sup>56</sup> and in the Sierra de Tlahualilo<sup>57</sup> north of the Parras basin in western Coahuila. Here we find a basement of Permian sediments and lavas intensely folded and intruded by granite.<sup>58</sup> Overlying the basement rocks unconformably Upper Aptian limestones are nearly horizontal. Above them is a section of interbedded gypsum and dolomite about 1,500 feet thick overlain by 500 feet of rudistid reef limestones of Albian age.

The gypsiferous deposits are believed to have accumulated in marginal lagoons which existed over the Coahuila Peninsula during early Albian time. The basement of the peninsula gradually subsided but its surface remained approximately at sea-level due to the deposition of evaporites in the lagoons. Periodically

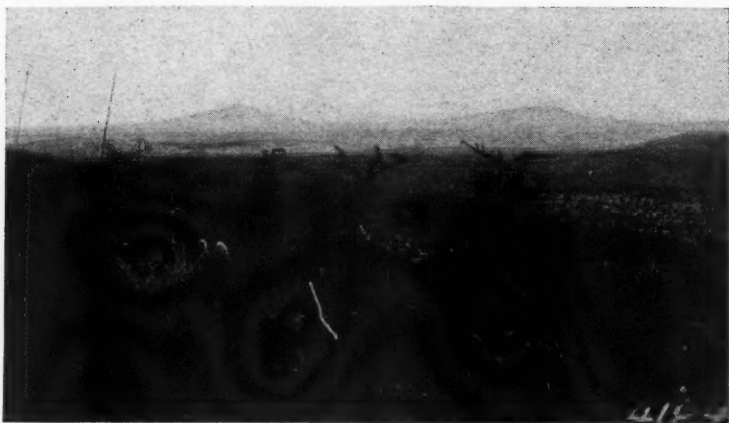


FIG. 9.—View S. 7° E. along crest of Sierra de Tlahualilo, Durango. This mature topography is more than 1,000 feet above level of broad intermontane valleys that surround range.

the sea swept across it enabling marine life to flourish temporarily and depositing calcareous sediments which gave rise to layers of fossiliferous dolomite interbedded with the gypsum. At the same time in the shallow waters surrounding the peninsula, where normal marine circulation prevailed, rudistids flourished in great profusion on the submarine banks. The accumulation of their shells formed

<sup>56</sup> W. A. Kelly, "Geology of the Mountains Bordering the Valleys of Acatila and Las Delicias," Evolution of the Coahuila Peninsula, Mexico, Part II, *Bull. Geol. Soc. America*, Vol. 47, No. 7 (July, 1936), pp. 1009-38.

<sup>57</sup> W. I. Robinson and L. B. Kellum, "Geology of Sierra de Tlahualilo Durango," *Bull. Geol. Soc. America*, Vol. 52, Pt. 2 (December, 1941), pp. 1930-31.

<sup>58</sup> R. E. King, "The Permian of Southwestern Coahuila, Mexico," *Amer. Jour. Sci.*, 5th Ser., Vol. 27 (February, 1934), pp. 108-11.

the Aurora limestone. This bioherm rim was no doubt largely the cause for the maintenance of lagoonal conditions over the peninsula.

In mid-Albian time subsidence became more rapid and permitted the sea waters to circulate freely over the entire peninsula, thus causing the rudistid reefs to migrate inward from its margins. Myriads of foraminifera also inhabited these shallow banks and their tests contributed appreciably to the formation of the limestones.<sup>59</sup>

To-day, in structurally downwarped areas on the peninsula, we find above the Aurora reef limestones remnants of the Indidura formation of late Lower and early Upper Cretaceous age. Its lithology, thickness, and fauna are very distinctive and are characteristic of environmental conditions which prevailed over the



FIG. 10.—View across central part of Sierro del Rosario Durango. Youthful topography and intense folding are characteristic of geosynclinal belt.

peninsula. The thin beds of buff platy limestone and shale have a total thickness of only about 100 feet in the type area.<sup>60</sup> They are highly fossiliferous with a near-shore molluscan fauna in which pelecypods and echinoids are dominant.<sup>61</sup> The well known forms of *Gryphaea washitaensis*, *Hemiaster calvani*, and *Exogyra arietina*, and others in the lower part indicate its Washita age, while *Inoceramus labiatus* in the upper part indicates beds equivalent to the Eagle Ford formation of Texas. These strata are in great contrast to the sediments which were being laid down at the same time in the deeper waters south of the peninsula. Along

<sup>59</sup> L. B. Kellum, "Miliolid Limestone in North-Central Mexico," *Proc. Geol. Soc. America*, 1936 (June, 1937), pp. 82-83 (abstract).

<sup>60</sup> W. A. Kelly, *op. cit.*, pp. 1028-29.

<sup>61</sup> T. S. Jones, *op. cit.*, pp. 85-86.

the northern part of Sierra de Parras, strata referred to the Indidura formation are more than 2,500 feet thick.<sup>62</sup> The section is dominantly gray shales interbedded with black limestone in thin ledges and contains few fossils. It has been subdivided into five members based chiefly on the relative proportion of limestone and shale present in different parts of the section. The environment of deposition of these beds south of the Coahuila Peninsula is so different from that in the type area of the Indidura formation that it would be useful to designate them by a different name.

#### CRITERIA FOR LOCATING BURIED PLATFORMS

The entire Cretaceous section in the area of the Coahuila Peninsula shows the influence of the underlying massif on sedimentation throughout a long period of geologic time. It indicates that facies of deposition may be used as a guide in locating buried positive elements in the subsurface where they would tend to localize the accumulation of oil.

Likewise, the influence of a buried massif on the structure of overlying strata is clearly demonstrated here by the contrast between the relatively simple warping of Lower Cretaceous rocks on the Coahuila Peninsula and the tight asymmetrical folding and overthrusting in the area of the surrounding geosyncline. This general relationship in the regional structure is another criterion for recognition of a positive block in the subsurface.

The physiography of the mountain ranges is an expression of the lithologic succession and geologic structure comprising them. Regionally it reveals the same contrast in underlying geology that exists between the Coahuila Peninsula and the geosyncline. Mountains in the peninsular area are dissected uplands with a mature, rolling topography over their broad summits (Fig. 9). This gives way abruptly at their margins to a youthful topography as the relief drops away rapidly to the level of the alluvium-filled, intermontane valleys. In the geosynclinal area the mountains are in topographic youth at their summits as well as on the flanks (Fig. 10).

#### CONCLUSIONS

This regional investigation of the geologic history of northern Mexico has demonstrated at least six periods of igneous activity since the beginning of Carboniferous time. During the same interval three periods of major diastrophism are recognized. In Coahuila where a large massif, once deeply buried, is now partly exposed on the surface, three types of criteria (lithology, structure, and physiography) would have revealed its presence in the subsurface even if the basement rocks were not exposed. In applying them to other areas where diastrophism has played a less important rôle due allowance must be made for de-

<sup>62</sup> R. W. Inlay, "Geology of the Western Part of the Sierra de Parras," Evolution of the Coahuila Peninsula, Mexico, Part IV, *Bull. Geol. Soc. America*, Vol. 47, No. 7 (July, 1936), pp. 1126-32.

grees of intensity of folding and for various environmental conditions affecting the lithology.

Where and how are we to apply these criteria to find oil? Not on the Coahuila Peninsula because there practically all of the Mesozoic section is exposed on the surface; the Paleozoic section has some possibilities but it had undergone intense deformation and peneplanation before the Cretaceous was laid down on top of it. We would not expect to find oil on the Plateau Central and Sierra Madre Oriental which are the continuation of the Basin-and-Range province of the United States, for there, too, the Mesozoic sections are exposed, and faulting has not revealed any oil seepages. The Sierra Madre Occidental has little prospect for oil because the lava flows are too thick in most places, and where erosion has cut through them, the Paleozoic and Mesozoic strata exposed beneath are deformed into mountain folds like those on the Plateau Central and the Sonoran Desert. The Sonoran Desert with its metamorphosed, deeply dissected Paleozoic rocks and its continental or igneous Mesozoic and Tertiary rocks is unpromising for oil production. The peninsula of Lower California may have very limited oil possibilities in the areas of marine Tertiary and Upper Cretaceous strata, but it is largely made up of Tertiary volcanics with a basement of metamorphics and intrusive igneous rocks.

The areas where great platforms, comparable with the Coahuila Peninsula, are likely to produce oil and gas in the future are the structurally downwarped provinces of the central United States and along the margins of the continent. The Central Lowland and Great Plains provinces of the United States, the California trough and other structural depressions of the Pacific Coast, and especially the Gulf Coastal Plain of the United States and Mexico undoubtedly contain ancient landmasses not yet discovered beneath younger sediments.

In northern Mexico east of Sierra Tamaulipas, between the San Carlos Mountains and the Rio Grande, or in the Rio Grande embayment proper we may expect to find other great fault blocks comparable with that of the Mexican South fields, on which reef organisms have lived and built their limestone bioherms. North of the Rio Grande in the Coastal Plain of Texas, Louisiana, Mississippi, and Alabama, as well as in eastern Mexico, there may be other positive blocks of the same nature and origin as the Sabine uplift. It has been contended that the enormous thickness of Tertiary sediments known to be present in the coastal plain near the present Gulf Coast would preclude the possibility of reaching the Lower Cretaceous formations with the drill. This, however, is not necessarily the case because the presence of a platform of the Coahuila type is a positive element which resists subsidence and sediments can only accumulate over it to the extent that it does subside below sea-level. The great thickness of sediments in the coastal plain has accumulated in the surrounding negative areas, while a relatively thin section was built on the platforms. Furthermore the profusion of benthonic life necessary to build highly organic reefs may have lived in the clear waters on the shallow submarine banks at any time during the Upper Cretaceous or Tertiary so

that it would not be necessary to seek the El Abra limestone as the only prospective reservoir. In a study of submarine topography in relation to sedimentation off the coast of California, Revelle and Shepard<sup>63</sup> observed that the banks and ridges, at whatever depth or distance from the shore, were receiving deposits of sand or of calcareous sediment or else had a rock bottom and that their sediments were notably coarser than those of the depressions and troughs. We may thus expect suitable sand reservoirs in the stratigraphic section above the buried platforms even if reefs of organic limestone are not present.

As shown in most of the large buried platforms already studied, they are reflected in the lithology and structure of overlying strata and may also have some topographic expression. Some of them may be located by geophysical methods; others may be discovered by stratigraphic methods. Systematic exploration by the stratigraphic methods will include the comparison of well and outcrop sections in regular profiles across the basins, with the principle in mind that the section will change appreciably and consistently over a buried platform. There should be close scrutiny of all the available surface and subsurface structural data over each of the basins as a whole, with the thought that any recognizable contrast in the regional structure may reveal the presence of an underlying mass.

<sup>63</sup> R. Revelle and F. P. Shepard, "Sediments off the California Coast," *Recent Marine Sediments* (Amer. Assoc. Petrol. Geol., 1939), p. 248.

## GEOLOGICAL NOTES

### FIELD AND WILDCAT DEVELOPMENTS IN SOUTH ARKANSAS IN 1942<sup>1</sup>

B. W. BLANPIED<sup>2</sup> AND ROY T. HAZZARD<sup>2</sup>  
Shreveport, Louisiana

#### FIELD DEVELOPMENTS

#### COLUMBIA AND OUACHITA COUNTIES, STEPHENS FIELD

During the year of 1942, 17 oil producers and 8 dry holes were completed in the Smart sand area of the Stephens field. The new developments in the Smart sand area are north of and adjacent to the originally developed limits of the Stephens field. The total production from the Stephens field for 1942 was 620,599 barrels of which 183,323 barrels were produced from the Upper Cretaceous and 437,276 barrels from the Lower Cretaceous.

The developments in the Smart sand area have given much interesting stratigraphic and structural information since electrical surveys were made of the greater number of the wells drilled, and core and sample information was available on numerous wells drilled in and adjacent to the field.

During December, 1942, a new producing formation was developed in the Stephens field with the completion of T. W. Lee's G. C. Hall No. 1, at the center of the SW.  $\frac{1}{4}$ , SW.  $\frac{1}{4}$  of Sec. 11, T. 15 S., R. 20 W.; elevation of derrick floor, 270 feet; total depth, 3,521 feet. The well was completed, December 10, pumping 300 barrels of fluid daily, 10% salt water, from perforations between 2,532 and 2,538 feet.

Electrical log of the Lee well shows depths of formation contacts as follows: 1,305 feet, top Arkadelphia chalky marl; 1,420 feet, top Nacatoch sand; 1,710 feet, top Saratoga chalk; 1,998 feet, base Annona chalk; 2,092 feet, top Stephens sand; 2,460 feet, base gravelly Tokio sand (base Austin); 2,460-2,510 feet, shale section upper Eagle Ford in age; 2,510-2,548 feet, basal Upper Cretaceous volcanic sand and gravel bed, the Lewisville volcanics, resting on lower Glen Rose; 3,065 feet, top James limestone; 3,484 feet, top first sand in "Travis Peak"; 3,521 feet, total depth.

During 1942, two wells in the Stephens field encountered the Ferry Lake (massive) anhydrite. These are the most northeasterly wells to date in South Arkansas which have encountered the Glen Rose anhydrite. Its presence in the subsurface of the Stephens field gives a clue to the pre-Upper Cretaceous structure of the area. The anhydrite sections in these two wells were preserved on the downthrown side of a pre-Upper Cretaceous fault which trends diagonally from northwest and southeast across the NE.  $\frac{1}{4}$  of T. 15 S., R. 19 W.

Northeast of the fault, the basal Upper Cretaceous rests on upper Glen Rose; southwest of the fault, it rests on lower Glen Rose.

Following is information on depths of contacts encountered in the two anhydrite wells. The Lyons well is a mile northeast of the discovery well of Lower Cretaceous production, the Crow Drilling Company's Smart No. 1, Sec. 12, T. 15 S., R. 20 W., completed in 1941; the Ownby Drilling Company's well is 0.6 mile northeast of the Lyons well.

From drilling to date, a post-Upper Cretaceous fault of less than 100 feet of movement and a pre-Upper Cretaceous fault of more than 200 feet of movement are recognized. Both trend from northwest to southeast with downthrow to the northeast.

<sup>1</sup> Presented by title before the Association at Fort Worth, April 7-9, 1943. Manuscript received, December 4, 1943.

<sup>2</sup> Gulf Refining Company.

C. H. Lyons<sup>3</sup>  
Taylor No. 1  
NE., NE. Sec. 12,  
T. 15 S., R. 20 W.  
Columbia Co.  
Elev. 288 Ft.  
Derrick Floor

Owby Drlg. Co.  
Halton No. 1  
SE., SW. Sec. 6,  
T. 15 S., R. 19 W.  
Ouachita Co.  
Elev. 312 Ft.  
Derrick Floor

	Depth in Feet	Depth in Feet
Top Arkadelphia	1,410	1,495
Top Nacatoch sand	1,522	1,605
Top Saratoga chalk	1,820	1,895
Base Annona chalk	2,118 (-1,830)	2,198 (-1,886)
Base Tokio	2,570	2,648
Upper-Lower Cretaceous contact	2,633 (-2,345)	2,710 (-2,398)
Top Massive anhydrite	2,663 (faulted contact)	2,870
Base Massive anhydrite	2,752 (-2,464)	2,993 (-2,681)
Top James limestone	Faulted out	3,657

The Owby Drilling Company's Halton No. 1, Sec. 6, T. 15 S., R. 19 W., is 600 feet lower structurally on the top of the James limestone than wells south of the faults. Two possible interpretations of the structural conditions existing north of the faults may be made. There may be a closure on the downthrown side against the faults, or an additional fault may exist. The latter interpretation gives a picture of step faults with downthrows on the north, like the structural picture at Stamps. Either interpretation is possible in the light of present subsurface information. South of the subsurface fault traces, the structure is domal in the Upper and Lower Cretaceous beds.

The subsurface of the Stephens field offers several interesting problems in the correlations of certain lithological units which have continuity over a broad area.

The terms "Hosston formation," "Sligo formation," and "Pine Island formation" were proposed by the Shreveport Geological Society and introduced by Imlay.<sup>3</sup> Imlay has discussed these formations in such detail that there should be no misunderstanding concerning the meaning and usage of the terms "Hosston" and "Travis Peak." Gayle Scott, Adkins, and Imlay have pointed out that the ammonites from the lower part of the Pine Island formation and from the upper part of the Sligo formation are Upper Aptian in age, as in the Travis Peak formation of Texas.

In Caddo Parish, the basal part of the Sligo formation, made up of dark fossiliferous shales and limestones appears to be transitional downward into the Hosston formation, which is approximately 2,000 feet thick in northern Louisiana. The lithologic character of the Hosston formation, considered as a unit, is fairly constant being made up of red and gray shales, gray and reddish sands, with a conglomeratic zone at the base of the formation. It shows great variability however, both laterally and vertically, in the distribution of the sands and shales.

In Claiborne Parish, in the Lisbon, North Lisbon, and Haynesville fields, a zone of red shale and sands is developed in the basal part of the Sligo formation, intervening between fossiliferous limestones and shales. Northward through Union and Columbia counties, Arkansas, red shales and sands occur progressively higher in the section, so that the Sligo-Hosston contact of northwestern Louisiana can not be determined with any certainty. In the vicinity of the Stephens field, the top of the "Travis Peak" is recognized by the first appearance of red shales and sands. These red shales and sand bodies are lenticular and the top of the "Travis Peak," as the term is used, merely indicates the first appearance of sediments which originally were described as characteristic of the type Travis Peak formation of Texas. The top of the Travis Peak of the Stephens area occurs

<sup>3</sup> Ralph W. Imlay, "Lower Cretaceous and Jurassic Formations of Southern Arkansas and Their Oil and Gas Possibilities," *Arkansas Geol. Survey Inf. Cir.* 12 (1940).

in beds which are correlated with the basal part of the Pine Island formation and the upper part of the Sligo formation. Therefore, it must be recognized that in South Arkansas, a group of beds having the lithologic character of the Travis Peak of Texas overlies another group of lithologically similar beds, the updip correlative of the Hosston formation.

V. E. Barnes, geologist of the Texas Bureau of Economic Geology, has recognized comparable conditions in Texas, in Gillespie, Blanco, and Burnet counties, on the south and east sides of the Llano uplift. He has prepared the following statement summarizing his interpretation of the stratigraphic relationships of the Travis Peak sand.

A statement is made in the "Lexicon of Geologic Names of the United States" *U. S. Geol. Survey Bull.* 896 (1938), p. 2185, as follows.

"In Tex., the Trinity is now called a group, divided, in eastern Tex., into (descending) Paluxy sand, Glen Rose ls., and Travis Peak sand. In southern Okla. and Ark. the Trinity deposits are not divisible, and *Trinity sand* is adopted name of U. S. Geol. Survey for the deposits of Trinity age, which there are chiefly sand. But *Trinity sand* in restricted sense in which the name was used in some early rept. (for basal sand of Trinity group) was long ago replaced by *Travis Peak sand*."

Travis Peak sand is used, therefore, as the name for the basal sand of the Trinity group. However, in Gillespie County, Texas, the sand rises still higher in the section until it is equivalent in age to the Walnut clay and a part of the Comanche Peak limestone.<sup>4</sup> The Travis Peak sand should be defined as the shoreward sandy facies of the Cretaceous system of Texas. It ranges widely in age, being equivalent to Glen Rose limestone, Walnut clay, Comanche Peak limestone, and possibly to other geologic units of the surface and the subsurface.

All of the calcareous facies of the Trinity group should be included in the Glen Rose limestone. The Cow Creek beds, originally placed in the Travis Peak formation, would then, at least in the vicinity of the type locality, become a tongue of the Glen Rose limestone. The Hensell sand in Blanco County is thinning eastward and should be considered as a tongue of the Travis Peak sand. The names Sycamore sand and Gillespie formation are local names for Travis Peak sand and should be dropped.

The basal part of the Tokio formation of the Stephens field is made up of grayish white tuffaceous (or tripolitic) conglomeratic sand which rests on a shale section made up of grayish green and red mottled bentonic clay shales. The clay section below the base of the Tokio gravels, in cores of which arneaceous foraminifera have been found, appears to grade downward into grayish lignitic argillaceous sands and greenish gray coarse-grained conglomerates, the matrix of which is water-laid volcanic ash. Similar ashy conglomerates have been cored in many wells in North Louisiana and South Arkansas at the base of the Upper Cretaceous. These water-laid volcanics are well exposed in southwest Arkansas and are traceable westward into Texas. They have been described by Ross, Miser, and Stephenson.<sup>5</sup>

#### LAFAYETTE COUNTY, PATTON FIELD

The discovery well of the Patton field, the Tide Water-Seaboard Oil Company's Moore No. 1, Sec. 29, T. 17 S., R. 24 W., was completed in October, 1941, and produced 13,146 barrels of oil from the Smackover limestone to the end of 1941. It was abandoned, January, 1942, after testing sands in the Cotton Valley formation.

The second Smackover limestone well in the Patton field, the Tide Water-Seaboard's Bendaw Estate No. 1, Sec. 32 T. 17 S., R. 24 W., was completed in August, 1942, with an initial production of 134 barrels of 45.4° gravity oil in 10 hours, flowing through  $\frac{1}{4}$ -inch tubing choke; gas-oil ratio 1665/1.

<sup>4</sup> V. E. Barnes, "Pre-Cambrian of Llano Region with Emphasis on Tectonics and Intrusives," in *Guidebook to Excursions* (Geol. Soc. America, 53d annual meeting, Austin, Texas, December, 1940), p. 52.

—, "Cretaceous Overlap on the Llano Uplift of Central Texas" (abstract), *Bull. Geol. Soc. America*, Vol. 52 (1941), pp. 1994-95.

<sup>5</sup> C. S. Ross, H. D. Miser, and L. W. Stephenson, "Water-Laid Volcanic Rocks of Early Upper Cretaceous Age in Southwestern Arkansas, Southeastern Oklahoma, and Northeastern Texas," *U. S. Geol. Survey Prof. Paper* 154F (1929).

The Bendaw well is 1,900 feet southwest of the Moore well. Structurally, it was 14 feet lower on the base of the Ferry Lake (massive) anhydrite than the Moore well and 2 feet lower on top of the Smackover limestone.

The production from the Bendaw well during 1942 was 11,011 barrels; cumulative production from both wells to the end of 1942 was 24,157 barrels.

#### UNION COUNTY, EAST SCHULER FIELD

The discovery well of the East Schuler field, the Crescent Drilling Company's Burns No. 1, Sec. 13, T. 18 S., R. 17 W., was completed in June, 1941. By the end of 1941, 4 oil wells and 2 dry holes had been drilled. Three of the 1941 producers were completed in the "Burns sand," one producer, the Atlantic Refining Company's Briggs No. 1, was completed in the "Briggs sand," 70 feet below the "Burns sand." Both sands are in the upper Cotton Valley Morgan sand zone of the near-by Schuler field.

During 1942, 3 "Burns sand" wells were completed, one of which, the Atlantic Refining Company's Briggs well drilled in 1941, was reworked and completed in the "Burns sand." Three dry holes were drilled during 1942.

The East Schuler field, with an approximate 240-acre extent, appears to have been defined by drilling. Electrical logs of producers and dry holes indicate that the "Burns sand" is a sand lense in the Morgan zone.

The total production from six wells during 1942 was 195,174 barrels; cumulative production to end of 1942 was 240,961 barrels.

#### UNION COUNTY, MT. HOLLY FIELD

The Atlantic Refining Company-Phillips Petroleum Company's Davis Unit No. 1, Sec. 15, T. 17 S., R. 18 W., discovery well of the Mt. Holly field, was completed in November, 1941, as a Smackover limestone producer.

During 1942, 3 oil wells, 1 gas-distillate well, and 1 dry hole were drilled in the Mt. Holly field. The estimated productive area at the end of 1942 was 200 acres.

The production for 1942 from the 5 wells was 128,872 barrels; cumulative production to the end of 1942 was 138,947 barrels.

#### UNION COUNTY, SCHULER FIELD

During 1941 and 1942, 8 producers were completed in the Schuler field in Cotton Valley sands below the Morgan zone. Six of these wells were completed during 1942.

Roberts and Murphy's Leone No. 1, Sec. 7, T. 18 S., R. 17 W., originally a Jones sand producer, was plugged back and recompleted in the "Leone sand" in May, 1941. This sand is 1,450 feet below the top of the Cotton Valley formation. Two "Leone sand" wells were completed during 1941.

During 1942, the Lion Oil Refining Company's Justiss A-2, Sec. 19, T. 18 S., R. 17 W., was plugged back and gun-perforated in the "Leone sand" between 6,804 and 6,808 feet, and tested dry. Casing was reperforated between 6,623 and 6,629 feet and the well completed with an initial of 270 barrels in 24 hours; gravity 39°; gas-oil ratio 460/1. The second "Justiss sand" well, completed by the Lion Oil Refining Company in 1942, was E. Morgan B 4, Sec. 18, T. 18 S., R. 17 W. The "Justiss sand" is 200 feet higher stratigraphically than the "Leone sand."

Four "Leone sand" wells were completed during 1942.

#### WILDCAT WELLS

The discovery of Smackover limestone oil in the Midway field initiated a drilling campaign in southern Arkansas during 1942, which led to the drilling of numerous deep tests on geophysical prospects, on suspected subsurface structures, and on drilling blocks. Dur-

ing the year only one additional Smackover limestone discovery was made, the Carter Oil Company's Orr No. 1, Miller County, which was a gas-distillate well.

A number of Smackover limestone tests drilled during the year are of interest.

#### COLUMBIA COUNTY, WEST STEPHENS AREA

M. S. Lake *et al.* Young No. 1, Sec. 21, T. 15 S., R. 21 W., elevation 378 feet, was abandoned as a dry hole in the Smackover limestone at the total depth of 6,712 feet. This test was originally drilled by L. L. Prock, in 1941, to 4,000 feet as a "Travis Peak" test.

The base of the Annona chalk was logged at 2,165 feet; Upper-Lower Cretaceous contact at 2,820 feet, with gravelly Lewisville volcanics resting unconformably on upper Glen Rose; base of Ferry Lake (massive) anhydrite, 3,007 feet; top of "Travis Peak," 3,855 feet; top of Cotton Valley, 4,895 feet; top of Buckner, 6,360 feet; and top of the Smackover limestone, 6,625 feet.

#### COLUMBIA COUNTY, BOX SPRINGS AREA

The Sinclair-Prairie Oil Company's F. W. Souter No. 1, Sec. 15, T. 17 S., R. 22 W., elevation 327 feet, was abandoned as a dry hole in the Smackover limestone at the total depth of 8,586 feet. This test was located on a seismograph prospect, the center of which is reported to be 8 miles west of the town of Magnolia. The base of the Annona chalk was logged at 2,624 feet; Upper-Lower Cretaceous contact, 3,300 feet, with the Lewisville volcanics resting unconformably on Paluxy sands; base of Ferry Lake (massive) anhydrite, 4,117 feet; top Cotton Valley, 6,252 feet; top Buckner, 8,228 feet; and top Smackover limestone, 8,388 feet.

#### HEMPSTEAD COUNTY, HENNESSY AREA

The Hy-Grade Oil Company's Copeland No. 1, Sec. 32, T. 14 S., R. 23 W., elevation 276 feet, was abandoned in April, 1942, as a dry hole in the Smackover limestone at the total depth of 6,388 feet. The following contacts were logged in the Copeland well: base Annona chalk, 1,698 feet; Upper-Lower Cretaceous, 2,390 feet, with Lewisville volcanics on Paluxy; base Ferry Lake (massive) anhydrite, 3,070 feet; top Cotton Valley, 4,812 feet; top Buckner, 6,099 feet; and top Smackover limestone, 6,350 feet.

The Copeland test is 4 miles northeast of the discovery well of the Midway field, the Barnsdall Oil Company's Bond No. 1, Sec. 11, T. 15 S., R. 20 W. Structurally, it is 204 feet higher than the Bond well on the base of the Ferry Lake (massive) anhydrite, 74 feet higher on top of the Cotton Valley, and 39 feet lower on top of the Smackover limestone. The Buckner was 92 feet thicker in the Copeland well than in the Bond well. Well control indicated that a sharp syncline flanks the Midway structure on the north; the Copeland well located on the north flank of the syncline.

#### HEMPSTEAD COUNTY, HERVEY AREA

The Barnsdall Oil Company-Sohio Producing Company's Schultz No. 1, Sec. 20, T. 14 S., R. 25 W., elevation 256 feet, was dry and abandoned, November, 1942, in the Smackover limestone at the total depth of 6,101 feet. This joint test was drilled on seismograph prospect northwest of the Midway field. The following contacts were logged in the Schultz well: base Annona chalk, 1,484 feet; Upper-Lower Cretaceous, 2,185 feet; base Ferry Lake (massive) anhydrite, 3,153 feet; top Cotton Valley, 4,615 feet; top Buckner, 5,672 feet; and top Smackover limestone, 5,950 feet.

Structurally, the Schultz well is 100 feet higher on the base of the Ferry Lake anhydrite than the discovery well of the Midway field, 9 miles southeast of it, and 340 feet higher on the top of the Smackover limestone.

## LAFAYETTE COUNTY, HERVEY AREA

The Mid-Continent Oil Company's Russell No. 1, Sec. 15, T. 15 S., R. 25 W., elevation 247 feet, was dry and abandoned in the Smackover limestone at the total depth of 7,274 feet. This test was located on a seismograph prospect. The following contacts were logged: base Annona chalk, 1,802 feet; Upper-Lower Cretaceous, 2,569 feet, with Lewisville volcanics unconformably on Paluxy; base Ferry Lake (massive) anhydrite, 3,580 feet; top Cotton Valley, 5,240 feet; top Buckner, 6,667 feet; and top Smackover limestone, 6,910 feet. The well is  $6\frac{1}{4}$  miles west and slightly south of the Barnsdall's Bond No. 1, discovery well of the Midway field. Structurally, the Russell well is 57 feet lower on the base of the Annona chalk than the Bond well, 335 feet lower on the base of the Ferry Lake anhydrite, and 630 feet lower on the top of the Smackover limestone.

## LAFAYETTE COUNTY, TAYLOR AREA

The McAlester Fuel Oil Company's Jeffus No. 1, Sec. 4, T. 19 S., R. 23 W., elevation 260 feet, was dry and abandoned in the Smackover limestone at 10,477 feet. It is reported that this test was located on a seismograph prospect. The following contacts were logged in the Jeffus well: base Annona chalk, 2,658 feet; Upper-Lower Cretaceous, 3,576 feet, with Lewisville volcanics unconformably on Paluxy; base Ferry Lake (massive) anhydrite, 4,968 feet; top Cotton Valley, 7,659 feet; top Buckner, 10,226 feet; top Smackover limestone, 10,392 feet. A core between 10,395 and 10,405 feet was made up of calcareous, oölitic sand with streaks of dense limestone. The top of the porous limestone containing salt water was logged at 10,433 feet. The well is  $7\frac{1}{2}$  miles southwest of the Atlantic Refining Company's Pinewood Lumber Company No. 1, Sec. 16, T. 18 S., R. 22 W., discovery well of the Dorcheat gas-distillate field. It is 91 feet lower structurally on the base of the Annona chalk than the Atlantic well, 709 feet lower on the base of the Ferry Lake anhydrite, and 1,537 feet lower on the top of the Smackover limestone.

## MILLER COUNTY, TEXARKANA AREA

Sylvester, Wadley *et al.* S. E. Mann No. 1, Sec. 4, T. 15 S., R. 28 W., elevation 32 feet, was dry and abandoned in the Smackover limestone at 6,510 feet. The following contacts were logged: base Annona chalk, 1,465 feet; Upper-Lower Cretaceous, 2,305 feet, with Lewisville volcanics unconformably on Paluxy; base Ferry Lake (massive) anhydrite, 3,708 feet; top Cotton Valley, 5,230 feet; top Buckner, 6,131 feet; top Smackover limestone, 6,363 feet. A core from the top of the Smackover limestone was made up of gray, cellular limestone containing salt water; a core 30 feet below the top of the Smackover limestone was hard, dense, gray limestone with streaks of dense, black shale.

The Mann well was located approximately 4 miles northeast of Texarkana, reportedly on a seismograph prospect.

## MILLER COUNTY, HERVEY AREA

The Tidewater-Seaboard and Barnsdall Oil Company's Sutton No. 1, Sec. 2, T. 15 S., R. 26 W., elevation 256 feet, was dry and abandoned in the Smackover limestone at 6,683 feet. The following contacts were logged: base Annona chalk, 1,672 feet; Upper-Lower Cretaceous, 2,418 feet, with Lewisville volcanics unconformably on Paluxy; base Ferry Lake (massive) anhydrite, 3,548 feet; top Cotton Valley, 5,117 feet; top Buckner, 6,366 feet; top Smackover limestone, 6,595 feet.

The Sutton well was located approximately 14 miles due east of Sylvester, Wadley's Mann well, Sec. 4, T. 15 S., R. 28 W. It is reported that the Sutton location was made on a seismograph prospect. Structurally, the Sutton well was 90 feet higher on the base of the Ferry Lake anhydrite than the Mann well, 45 feet higher on the top of the Cotton Valley, but 300 feet lower on the top of the Smackover limestone.

## NEVADA COUNTY, SUTTON AREA

M. E. Wakefield *et al.* Saunder-Rousse Unit No. 1, Sec. 4, T. 13 S., R. 22 W., elevation 394 feet, was dry and abandoned in the Smackover limestone at 4,050 feet. No electrical survey was made of this test and contact points are based on sample information and the driller's log. This was one of the most northerly Smackover limestone tests during the year; it is 17 miles northeast of the Midway field. The Ferry Lake (massive) anhydrite was not encountered in the Wakefield well, although in the King's Wren No. 1, Sec. 6, T. 13 S., R. 22 W., 2 miles west of the Wakefield well, approximately 30 feet of the Ferry Lake anhydrite was present. Pre-Upper Cretaceous erosion accounts for the absence of the anhydrite in the Wakefield well. The following contacts are reported for the Wakefield well from sample data: base Annona chalk, 1,165 feet; Upper-Lower Cretaceous, 1,775 feet; top James limestone, 2,155 feet; top Cotton Valley, 2,870 feet, with Hosston red shales and gravels above; top Smackover limestone, 3,833 feet. Pink and red anhydrite with red and green shales was cored between 3,710 and 3,807 feet. The top of the Buckner formation is not known, but it may be at 3,680 feet. A core of the Smackover limestone between 3,835 and 3,850 feet was porous limestone with salty taste and no odor of oil or gas.

## OUACHITA COUNTY, CAMDEN AREA

The North Central Texas Oil Company's Fort Smith Lumber Company No. 1, Sec. 15, T. 12 S., R. 17 W., elevation 122 feet, was dry and abandoned in the Eagle Mills redbeds at 3,505 feet. The following contacts were logged: base Annona chalk, 1,650 feet; base Tokio (base Austin), 2,100 feet, with basal Tokio gravels on Eagle Mills redbeds. At its total depth, 1,405 feet at the Eagle Mills formation were penetrated. The Eagle Mills formation is considered to be pre-salt Jurassic in age.

The basal Tokio gravels of South Arkansas progressively overlap older and older formations in the subsurface. These gravels transgress the buried outcrops of the Lower Cretaceous, Jurassic, and Paleozoic rocks and they may be seen at the surface in contact with folded Paleozoic rocks.

## OUACHITA COUNTY, LAKESIDE AREA

J. F. Magale's (Sohio Producing Company) Daniel and Parker No. 1, Sec. 17, T. 13 S., R. 16 W., elevation 102 feet, was dry and abandoned in the Smackover limestone at the total depth of 3,602 feet. This test was 4 miles northeast of Camden, and 8 miles southeast of the North Central Texas Oil Company's Fort Smith Lumber Company No. 1, Sec. 15, T. 12 S., R. 17 W. The following contacts were logged in the Magale well: base Annona chalk, 1,970 feet; base Tokio, 2,477 feet, with basal Tokio gravels on Cotton Valley; top Buckner, 3,135 feet; top Smackover limestone, 3,242 feet.

The Magale well encountered a section of 658 feet of Cotton Valley, 107 feet of Buckner, and 359 feet of Smackover limestone which was not present in the North Central Texas Oil Company's well, 8 miles northwest.

The basal conglomerate of the Cotton Valley, between 3,105 and 3,135 feet, contained pebbles ranging in diameter size from  $\frac{3}{4}$  inch to  $2\frac{1}{2}$  inches; part of a cobblestone at least 6 inches in greatest dimension was obtained in a core.

FIELD DEVELOPMENTS IN NORTH LOUISIANA IN 1942<sup>1</sup>

B. W. BLANPIED<sup>2</sup> AND ROY T. HAZZARD<sup>2</sup>  
Shreveport, Louisiana

## CALDWELL PARISH, CLARKS (KELLY) GAS FIELD

The Mudge Oil Company's International Paper Company No. 1, Sec. 6, T. 11 N., R. 4 E., was the only well drilled during 1942 in the Clarks gas field. It was located one mile southeast of the discovery gas well and was completed as a dry hole in the Wilcox formation at the total depth of 3,521 feet.

## CATAHOULA PARISH BIG SLOUGH (LARTO LAKE) OIL FIELD

One well, a dry hole, Sec. 14, T. 5 N., R. 5 E., was drilled in the Big Slough field in 1942, and was abandoned at 5,265 feet, in the Wilcox formation.

One oil well, the discovery well, and 3 dry holes were drilled in the Big Slough field by the end of 1942. The total production during 1942 was 28,347 barrels; the total cumulative production at end of 1942 was 38,246 barrels.

## CATAHOULA PARISH, WILLOW LAKE OIL FIELD

During 1942 three dry holes were drilled in the Willow Lake field. The two oil wells completed during 1941 produced 90,148 barrels during 1942, with a cumulative production at the end of 1942 of 93,558 barrels.

## CLAIBORNE PARISH, ATHENS GAS-DISTILLATE FIELD

During August, 1942, the Skelly Oil Company completed Kinnebrew No. 1, Sec. 26, T. 20 N., R. 7 W., as a dry hole at the total depth of 6,843 feet. The Kinnebrew well is 1½ miles northwest of the Hardin (Skelly and Sunray) Valentine No. 1, Sec. 31, T. 20 N., R. 6 W., discovery well of Lower Cretaceous gas-distillate production in the Athens field which was completed during 1941.

The six Lower Cretaceous tests drilled to date in the Athens area, show that the discovery well is on the south and upthrown side of a fault which trends southwest and northeast through the southeast part of T. 20 N., R. 7 W.

The discovery well was closed during the greater part of 1942. The total production for 1942 was 632 barrels, and the cumulative production was 2,733 barrels.

## CLAIBORNE PARISH, HAYNESVILLE FIELD

T. L. James' Akins No. 1, Sec. 27, T. 23 N., R. 8 W., discovery well of Pettit limestone production in the Haynesville field, was completed in November, 1941. During 1942, 126 Pettit limestone producers and 3 dry holes were drilled in the field. The northern limit of production, defined by drilling during 1942, crossed the Louisiana-Arkansas line into T. 20 S., R. 20 W., Columbia County, Arkansas.

Oil is produced from two porous limestone members of the Pettit limestone, which are separated by an interval of 60 feet. The top of the upper zone is 60 feet below the top of the Three Finger limestone.

Detailed engineering studies have been made of the Pettit reservoir of the Haynesville field, because of the possibility that increased recoveries might be effected through unitized repressuring operations. The Haynesville Pettit reservoir appears to be a closed porous limestone lense without an effective water drive, and it may be classified as a gas-

<sup>1</sup> Presented by title before the Association at Fort Worth, April 7-9, 1943. Manuscript received, December 4, 1943.

<sup>2</sup> Gulf Refining Company.

expansion type of reservoir. Original bottom-hole pressure is estimated to have been 2,440 pounds, corrected to a subsea depth of -5,000 feet. By the end of 1942, drilling indicated that the area of Pettit production may approximate 13,000 acres inclusive of the developments in Claiborne Parish, Louisiana, and Columbia County, Arkansas.

Pipe-line runs for 1942 were 3,757,483 barrels and the cumulative production at the end of 1942 was 3,766,056 barrels.

#### CLAIBORNE PARISH, NORTH LISBON FIELD

The stratigraphic and structural information derived from deep drilling in the North Lisbon field has been of particular interest to geologists in North Louisiana since the greatest thickness of Jurassic encountered to date in the Arkansas-Louisiana-Texas area has been found in the North Lisbon field.

An interpretation of the stratigraphy of the deeper beds indicates the existence of complicated fault relationships which are pre-Lower Cretaceous in age. The North Lisbon structure, as contoured on top of the Smackover limestone, may be interpreted, in terms of salt-dome structure, as an early stage in the growth of a penetration salt dome.

Smackover limestone gas-distillate production was discovered in the North Lisbon field in March, 1941, by the completion of the Union Producing Company's Meadows A1, Sec. 18, T. 21 N., R. 4 W. Casing was perforated between 10,148 and 10,398 feet with 726 shots and the well was completed flowing 480 barrels of 55.9° gravity distillate per day, gas-oil ratio 9900/1.

During August, 1941, the Big West Drilling Company completed Alford No. 1, Sec. 11, T. 21 N., R. 4 W., producing initially 56 barrels per day of 59° gravity distillate and 3,000,000 cubic feet gas from a sand in the upper part of the "Travis Peak" formation. This well is 3.6 miles northeast of the Union Producing Company's Meadows A1.

During 1942, there were 5 gas-distillate wells completed in the North Lisbon field, and 1 dry hole. The dry hole, the Big West's Mitchem No. 1, Sec. 12, T. 21 N., R. 4 W., was one mile east of the Alford No. 1. Of the 5 gas-distillate completions, 2 were completed in sands in the upper part of the "Travis Peak," 2 in the Cotton Valley, and 1 in the Smackover limestone. By the end of 1942, there were 3 "Travis Peak" sand producers, 2 Cotton Valley sand producers, and 2 Smackover limestone producers in the North Lisbon gas-distillate field.

Table I presents a summary of the completion data for the gas-distillate producers in the North Lisbon field.

The structure of the North Lisbon field, as contoured on the base of the Ferry Lake anhydrite, may be a closed domal feature, although a closure at the northeast is conjectural, at present, because of the lack of well control.

The five deep Smackover limestone tests drilled in the North Lisbon field, in Secs. 18-19, T. 21 N., R. 4 W., and in Sec. 13, T. 21 N., R. 5 W., considered as a group, are 3 miles southeast of the indicated center of the anhydrite closure. No faulting of the anhydrite is apparent in these deep wells. Subsea depths of the top of the Bodcaw sand and of the base of the Shongaloo member in the five wells, and the variations in thickness of the upper Cotton Valley, indicate that minor faulting took place before the Lower Cretaceous was laid down.

A comparison of subsea depths, of electrical log markers within the lower Cotton Valley of the five wells in relationship to the top of the Smackover limestone gives an interpretation that several of the wells may be cut by the same major fault.

Structural mapping on the top of the Smackover limestone (with top reconstructed for two faulted wells) and on the top of the salt (with salt depths estimated for three wells) shows the existence of a sharp domal structure which is downfaulted on the southwest. It will be noted that the Union's Duke well, in Sec. 18, is 416 feet higher structurally on the salt than the Meadows A1 northeast of it, in the same section.

The Union's McDonald well in Sec. 13 appears to have a normal section below the Shongaloo member. It is considered to be located on the downthrown side of a major northwest-southeast fault which appears to have a movement of approximately 1,900 feet.

The structural picture of the North Lisbon field on the top of the Smackover limestone is incomplete, in that there is no deep well control on the north or northeast. The deep fault relationships, and the indicated sharp domal structure on the top of the Smackover

TABLE I

Date Completed	Company	Well No.	Location*	Total Depth (Feet)	Initial Production†	Producing Formation (Depth in Feet)	Remarks‡
Mar. 11, '41	Union Prod. Co.	Meadows A1	18-21-4	10,834	480 bbls., 55.9° dist., G.O.R., 9,900/1, T.P., 2,500, C.P. 3,000	Smackover ls. 10,148-10,393	Lower Cotton Valley faulted against upper part of Smackover ls. T.D. in salt
Aug. 25, '41	Big West Drilg. Co.	Alford	11-21-4	6,205	56 bbls., 50° dist., 3.8 MM, T.P. 1,900, C.P. 2,000	"Travis Peak" 5,098-5,112 5,150-5,182	T.D. in "Travis Peak"
May 26, '42	Union Prod. Co.	McDonald	13-21-5	12,592	20 bbls., 50.5° dist., 50,000 cu. ft.	Cotton Valley 9,100-9,582	T.D. in Smackover ls. Unfaulted section to top Smackover ls.
July 27, '42	Union Prod. Co.	Meadows B1	13-21-5	10,540	198 bbls. dist., T.P., 3,900	Smackover ls. Below 10,234	Lower Cotton Valley faulted against Buckner. T.D. in Smackover ls.
Aug. 26, '42	Union Prod. Co.	Morrow	19-21-4	11,007	30 MM, C.P. 2,060	"Travis Peak" 5,296-5,310	Lower Cotton Valley faulted against Buckner. T.D. in Smackover ls.
Sept. 28, '42	Union Prod. Co.	Duke	18-21-4	11,455	17 bbls. dist., G.O.R. 30,000/1, C.P. 700, T.P. 550	Cotton Valley 8,505-8,525	Lower Cotton Valley faulted against lower part of Smackover. T.D. in salt
Dec. 1, '42	Big West Drilg.	Stewart	3-21-4	5,303	45 MM, C.P. 2,068	"Travis Peak" 5,198-5,216	T.D. in Travis Peak

\* Section—Township North—Range West.

† Bbls.—barrels.

Dist.—distillate.

G.O.R.—gas-oil ratio.

T.P.—tubing pressure in pounds.

C.P.—casing pressure in pounds.

MM.—1 million cubic feet of gas.

‡ Ls.—limestone.

T.D.—total depth.

limestone, may be interpreted as structure related to salt intrusion marking an incipient stage in the growth of a penetration salt dome.

Table II presents pertinent data on subsea depths of marker horizons encountered in the five deep wells and the thicknesses of certain stratigraphic units. The estimated unfaulted thickness of the Smackover limestone in the North Lisbon field is 1,615 feet.

#### DE SOTO AND NATCHITOCHES PARISHES, AJAX OIL FIELD

The two Paluxy sand wells completed during 1941 in the Ajax field were abandoned during 1942 after producing a total of 4,120 barrels. One dry hole, Sec. 13, T. 10 N., R. 11 W., was drilled in 1942.

#### LA SALLE PARISH, CYPRESS BAYOU OIL FIELD

The Cypress Bayou field, Sec. 12, T. 6 N., R. 4 E., was discovered, June, 1941, by the completion of H. R. Scivally Trustee's Louisiana Delta Hardwood Lumber Company No. 1. By the end of 1941, the second oil well had been completed and 2 dry holes had been

drilled. In the early part of 1942, the Scivally discovery well was plugged and abandoned, leaving one producing well in the field. One dry hole was drilled during 1942. The total production of the field during 1942 was 43,882 barrels; the cumulative production at the end of 1942 was 80,834 barrels.

LA SALLE PARISH, LITTLE CREEK FIELD (WILCOX SAND DEVELOPMENT)

The discovery well of the Little Creek field, the Placid Oil Company's Doughty No. 1, Sec. 32, T. 9 N., R. 2 E., was completed on March 26, 1941. By the end of the year, 48 Wilcox sand oil wells, 3 gas wells, and 7 dry holes had been drilled. During 1942, drilling was practically confined to the west and southwest parts of the field, with the completion of 18 oil wells, 2 gas wells, and 5 dry holes. At the end of 1942, the field was practically fully developed with the total completion for the field of 66 wells, 5 gas wells, and 12 dry holes.

TABLE II

	Meadows A1 Sec. 18-21-4*	Duke Unit Sec. 18-21-4	Morrow Unit Sec. 19-21-4	Meadows B1 Sec. 13-21-5	McDonald Unit Sec. 13-21-5
Elevation (derrick floor)	242†	277	316	290	323
Base Annona chalk	-2,310	-2,293	-2,292	-2,313	-2,287
Upper Cretaceous-Lower Cretaceous contact	-3,388	-3,376	-3,381	-3,400	-3,387
Base Ferry Lake (massive) anhydrite	-3,730	-3,735	-3,730	-3,770	-3,795
Top Hosston ("Travis Peak")	-4,920	-4,933	-4,922	-4,967	-4,997
Top Cotton Valley	-7,101	-7,170	-7,107	-7,170	-7,160
Top Bodcaw sand	-7,628	-7,733	-7,674	-7,745	-7,737
Base Shongaloo member	-8,928	-9,298	-9,054	-9,308	-9,200
Cotton Valley-Buckner contact	Buckner faulted out, lower C.V. faulted against Sm. ls. near top of ls.	Buckner faulted out, lower C.V. faulted against Sm. ls. near base of ls.	Lower C.V. faulted against Buckner at -10,071 feet	Lower C.V. faulted against Buckner at -9,772 feet	-11,147
Top Smackover limestone	-10,006 (Fault contact)	-10,846 (Fault contact)	-10,284 (Normal contact)	-9,937 (Normal contact)	-11,480 (Normal contact)
Top salt	-11,587	-11,171	Not reached	Not reached	Not reached (Est. -13,170)
Hosston thickness	2,181	2,237	2,185	2,203	2,202
Upper Cotton Valley thickness to base of Shongaloo member	1,827	2,128	1,947	2,138	2,091
Lower Cotton Valley thickness—below base of Shongaloo member	1,078 (Faulted)	1,548 (Faulted)	1,017 (Faulted)	464 (Faulted)	1,887
Total Cotton Valley thickness	2,905	3,676	2,964	2,602	3,978
Buckner thickness	Faulted out	Faulted out	213 (faulted)	165 (faulted)	333 (Normal)
Smackover limestone thickness (including red-beds between base of limestone and top of salt)	1,581 (Faulted)	325 (Faulted)	Base not reached 324 feet penetrated	Base not reached 319 feet penetrated	Base not reached 788 feet penetrated

NOTE: Fred M. Swain has in manuscript form now ready for publication a new classification of the Cotton Valley formation. Sexton gravel zone of Cotton Valley formation of former usage is now designated Shongaloo member of Schuler formation.

Well spacing in North Lisbon field is one well to 320 acres. 1942 distillate production and cumulative production to end of 1942 from North Lisbon field is as follows:

	1942	Cumulative to End 1942
"Travis Peak"	4,496	4,996
Cotton Valley sands	4,793	4,793
Smackover limestone	120,619	198,507
Total	138,908	208,296

\* Section-Township North-Range West.

† Figures in feet.

Production in the Little Creek field is found in a series of sands in the Eocene Wilcox formation. The top of the main group of producing sands is encountered at an approximate depth of 2,400 feet. The zone of producing sands is the approximate equivalent of the zone of oil sands found in the Olla field, the south edge of which is 4 miles northeast of the Little Creek field. The 1,700-foot Urania sand in the top of the Wilcox formation, the shallowest producing sand found in the Little Creek field, is practically depleted.

Producing sands of the Little Creek field have been named after the well in which the particular sand was first produced. At present, there are 9 productive sands in the field. Table III shows the number of completions in each sand by years.

TABLE III

Name of Sand	No. of Producing Wells Completed		Total Completions End 1942	
	1941	1942	Oil	Gas
Urania	3	—	3	—
Doughty No. 1	22	—	22	—
Doughty No. 3	3	—	3	—
Goodpine No. F-102	2*	4	4	2
Goodpine No. B-2	14	16†	28	2
Goodpine No. F-41	3	—	3	—
Doughty No. 2	2‡	—	1	1
Tannehill and Gallagher No. 5	1	—	1	—
Goodpine No. B-1	1	—	1	—
	—	—	—	—
	51	20	66	5

\* Gas wells.

† 14 oil and 2 gas wells.

‡ 1 oil and 1 gas well.

The structure of the Little Creek field, contoured on the top of the Goodpine B-2 sand, is an elongate anticlinal fold with the major axis trending northwest and southeast. The total reversal to the northwest is not determinable but is probably not in excess of 30 or 40 feet. Small closures are locally developed along the axis of the anticline. The productive area in general conforms with the structural feature, but is locally modified by sedimentary conditions. The productive area of the field approximates 2,840 acres. A 40-acre spacing prevails in the field. The total production during 1942 was 1,333,383 barrels, and total production to the end of 1942 was 1,749,732 barrels.

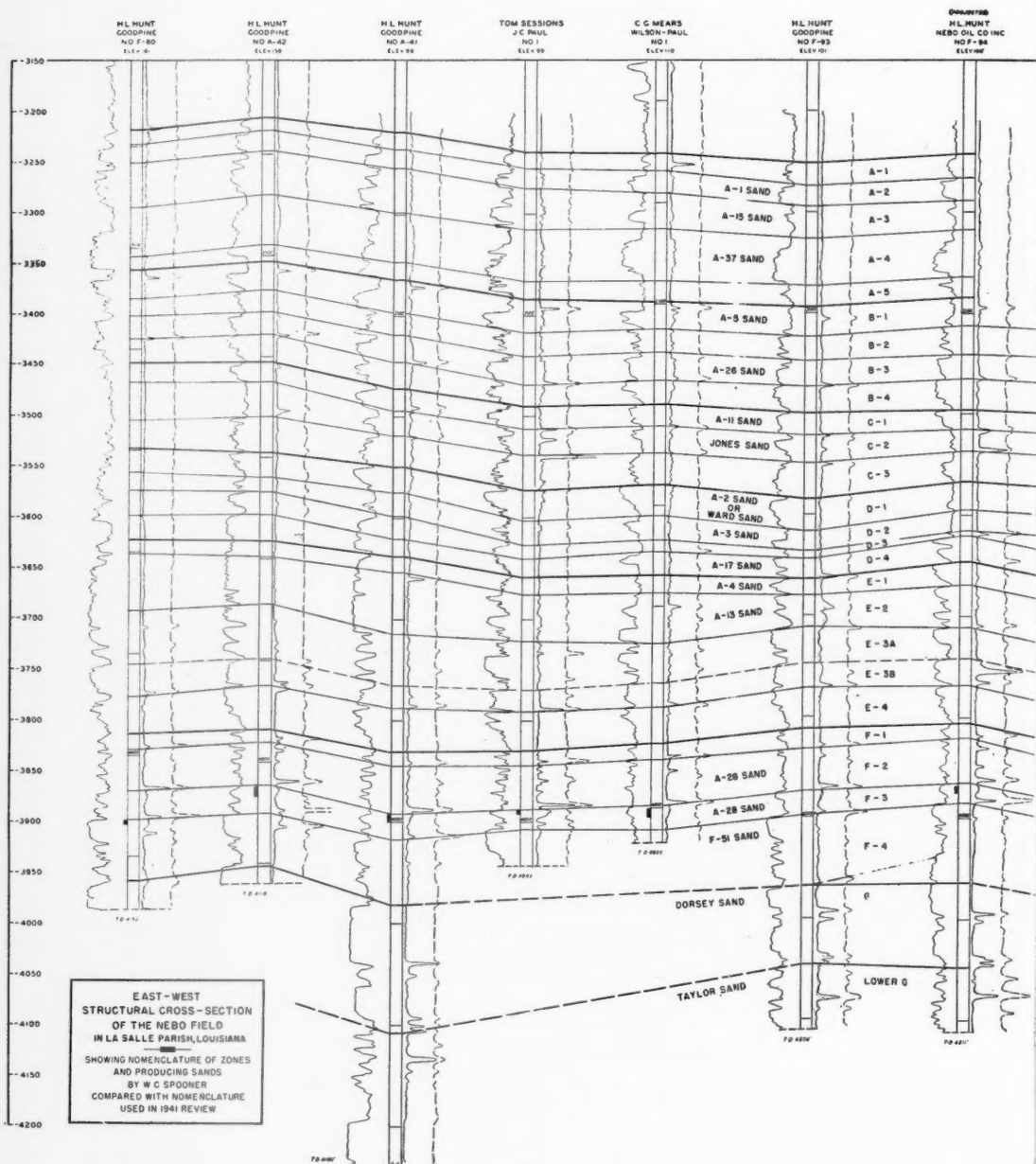
#### LA SALLE PARISH, NEBO OIL FIELD (WILCOX SAND DEVELOPMENT)

Development of the Nebo field was rapid during 1942. Routine drilling extended the producing limits approximately  $1\frac{1}{2}$  miles south, connecting the Hemphill field with the Nebo field. Since the two producing areas are merged, the Hemphill field now is considered part of the Nebo field. Slight extensions were made beyond the 1941 northeast limits of production into Secs. 2 and 3, and on the northwest into Secs. 5 and 8, T. 7 N., R. 3 E. The greater part of the 1942 developments were confined to Secs. 21, 22, 28, 39 and 40, T. 7 N., R. 3 E., in the south part of the field. One hundred thirty-nine Wilcox sand producers and 25 dry holes were dilled to the end of 1942. Two of the dry holes are in the central part of the field; the dry hole in Sec. 15 was drilled in 1941 and the dry hole in the west part of Sec. 39 was drilled in 1942.

The productive area of the Nebo field at the end of 1942 was approximately 5,900 acres, nearly double the proved area of the Nebo and Hemphill developments at the end of 1941. During 1942, 62 Wilcox sand oil wells and 1 gas well were completed, and there were 12 dry holes.

The "Taylor sand" was discovered during 1942, with 8 oil-well completions made during the year. The discovery well, the Placid Oil Company's John Taylor Unit No. 1, Sec. 40, T., 7 N., R. 3 E., was completed on January 17, 1942, flowing 135 barrels of fluid with input gas, 26% salt water, in 24 hours through perforations between depths of 4,180 and 4,183 feet. The top of the Taylor sand is 1,645 feet below the top of the Wilcox, and is approximately 100 feet lower stratigraphically than the "Dorsey sand," the deepest pro-

## GEOLOGICAL NOTES



ducing sand discovered during 1941. All of the Taylor sand wells are in the south part of the field and the seven additional completions are north or northwest of the Taylor sand discovery well. One of the Taylor sand completions, Hunt's Goodpine F-59, Sec. 16, T. 7 N., R. 3 E., was originally completed in a shallower sand.

No new completions were made in the Dorsey sand during 1942. Hunt's Goodpine F-68, Sec. 10, T. 7 N., R. 3 E., a 1941 Dorsey sand producer, was recompleted as a 28 million-foot gas well from a sand between depths of 3,684 and 3,692 feet.

Two Cockfield sand oil wells located on the southwest edge of the Nebo field were completed in 1942. These wells were dry holes in the Wilcox sands.

Contoured on the top of the Wilcox formation, the structure of the Nebo field is essentially a terrace. Contoured on deeper producing sands, the terrace structure still exists, with small superposed domes having a range of 10 to 20 feet of closure. Variations in the intervals between producing sands indicate the presence of slight local disconformities within the Wilcox. Structural contour maps drawn on different sands differ in local details. Successful completions in the Wilcox sands are dependent on the proper structural position of the sand together with desirable reservoir conditions of porosity, permeability, and sand thickness. Due to the lenticular character of some of the sands, there are many barren areas where production might otherwise be expected from consideration of the favorable structural position. It is noted that gas and oil production generally conform with the small local structures.

For convenience in tabulating the data of the many producing Wilcox sands of the Nebo field, W. C. Spooner has subdivided the stratigraphic interval containing the oil sands, of approximately 900 feet in thickness, into 7 zones. The uppermost zone is designated the "A" zone, the deepest zone the "G" zone. Each of the zones thus established includes from 3 to 5 sands. The accompanying part of a cross section through the Nebo field (Fig. 1), has been furnished by Spooner and it illustrates clearly the various subdivisions. The correlation of electrical logs in conjunction with the use of core records and production data are the bases on which the subdivisions are established. At present, there may be 26 distinct oil sands in the Nebo field, most of which are productive in various parts of the field. In the 1941 review of developments in Louisiana and Arkansas,<sup>3</sup> a tabulation was given which listed the producing oil sands in the Nebo field. The discovery well number or farm name was used as a sand name; this tabulation showed the number of wells producing from each sand at the end of 1941. So that readers of these development papers may compare the present number of wells producing from each sand of the Nebo field with the Table XVII of the 1941 review, the sand names used in that report have been added to Spooner's section. The Goodpine A-1 discovery sand of the field is the A-2 sand of the section. The original Goodpine A-2 sand which was correlated with the Ward sand of the Hemphill area is Spooner's D-1 sand, the Goodpine A-28 sand is divided into the F-2 and F-3 sands by Spooner, the Goodpine F-51 sand is the F-4 sand, the "Dorsey" sand is the sand at the top of Spooner's G zone, and the "Taylor" sand is the lower G zone.

Table IV shows the number of wells producing oil or gas from each sand as of December 31, 1942.

The 25 dry holes completed by the end of 1942 have fairly well established the productive limits of Nebo field and it is considered to be practically fully developed. Many of the Wilcox sand wells have been reworked, and are now producing from different sands than in which the original completion was made. Most of the wells in the field eventually will be reworked before all the oil sands are depleted. At the end of 1942 there were 132 wells on production, many of which were being produced by artificial lift. It is difficult to complete wells without salt water because of the fact that the oil-saturated part of the

<sup>3</sup> B. W. Blanpied and Roy T. Hazzard, "Developments in North Louisiana and South Arkansas in 1941," *Bull. Amer. Assoc. Petrol. Geol.*, Vol. 26, No. 7 (July, 1942), pp. 1268-70, Table XVII.

relatively thin sands is in most wells underlain by salt water. In many wells several squeeze jobs are necessary before a successful completion is made. Small areas of gas cap are present in many of the sands in various parts of the field. It seems apparent that there is no effective water drive in the field since so many of the wells are on artificial lift.

TABLE IV

<i>Sand</i>	<i>No. Wells</i>	<i>Sand</i>	<i>No. Wells</i>
A-1	1	E-2	5
A-2	8	E-3	3
A-4	3	E-4	1
B-1	14	F-1	1
B-2	1	F-2	10
C-1	2	F-3	29
C-3	1	F-4	17
D-1	15	G (Upper)	3
D-2	8	G (Lower)	8
D-4	9		

A 40-acre spacing prevails in the Nebo field. 1942 production was 3,142,802 barrels and the total production to the end of 1942 was 4,121,511 barrels.

#### LA SALLE PARISH, NORTH NEBO (SOUTH JENA) OIL FIELD

The North Nebo (South Jena) field was discovered, June 1941, by the completion of H. L. Hunt's Goodpine Oil Company's C1, Sec. 33, T. 8 N., R. 3 E. By the end of 1941, 7 oil wells and 4 dry holes had been drilled in the field. During 1942, 3 dry holes were drilled with no additional oil-well completions. Seven oil wells and 7 dry holes were drilled by the end of 1942. The total production for 1942 was 153,179 barrels; cumulative production was 207,983 barrels. With a 40-acre per well spacing program, 280 acres have been proved productive in the North Nebo field.

#### LA SALLE PARISH, SOUTH OLLA (SUMMERVILLE) OIL FIELD

The South Olla (Summerville) field was discovered, March, 1941, by the completion of the Placid Oil Company's Tremont Lumber Company No. 1, Sec. 23, T. 9 N., R. 2 E. During 1941, 8 oil wells and 8 dry holes were drilled. During 1942, 4 oil wells and 3 dry holes were drilled.

The structure of the South Olla field as contoured as a producing oil sand is a south-trending structural nose with superposed small closed "highs." By the end of 1942, approximately 480 acres have been proved productive.

The total production during 1942 was 199,760 barrels; cumulative production at the end of 1942 was 249,775 barrels.

#### LA SALLE PARISH, TROUT CREEK OIL FIELD

The discovery well of the Trout Creek field, Scruggs and Todd's Pipes No. 1, Sec. 19, T. 8 N., R. 3 E., was completed, August, 1941. The discovery oil well had 4 direct offset dry holes and 2 diagonal off-set dry holes. The latter 2 were drilled in 1942.

During 1941, 4 oil wells, 1 gas well, and 5 dry holes were drilled in the field; during 1942, 3 oil wells and 5 dry holes were drilled.

The total production during 1942 was 111,826 barrels; cumulative production was 128,327 barrels.

## REVIEWS AND NEW PUBLICATIONS

\* Subjects indicated by asterisk are in the Association library, and are available, for loan, to members and associates.

### \*HYDROCARBONS OF THE UINTA BASIN OF UTAH AND COLORADO, BY CLARK F. BARB AND JAMES OGDEN BALL

The Department of Publications of the Colorado School of Mines, Golden, announces the publication of "Hydrocarbons of the Uinta Basin of Utah and Colorado" as Volume 39, Number 1, of the *Quarterly* of the Colorado School of Mines.

Under this title are included treatments of two phases of the subject: "Review of Geology and Field Work" by Clark G. Barb, professor of petroleum engineering, and "Survey of Bitumen Analyses and Extraction Methods" by James Ogdén Ball, associate professor of petroleum engineering.

Professor Barb has included in his paper, in addition to a discussion of past field work, considerable new material which has resulted from his recent work in the basin. Adding to the value are also 17 figures and two plates, both 16-by-22-inch maps of the Uinta Basin; one showing the locations of known hydrocarbon deposits and the general surface geology of the Tertiary period, and the other showing locations of towns, streams, railroads, and roads. A bibliography of 130 references and an appendix, giving well logs and a cost estimate for a 300-barrel plant, are also included.

Professor Ball in his section not only surveys the bitumen analyses and extraction methods resulting from past research, but adds the methods and results of research that he has conducted in the past several years. Two figures, showing a diagram of true-boiling-point apparatus and illustrating proposed processes for isolating constituents, and 26 tables add to the value of his work. A bibliography of 23 references is included.

This issue of the *Quarterly* comprises 115 pages and copies may be obtained from the Department of Publications of the Colorado School of Mines, Golden, Colorado, at \$1.50 postpaid.

## RECENT PUBLICATIONS

### CANADA

"The Petroleum Geology of Canada," by George S. Hume. *Geol. Survey Canada Bull.* 98 (Ottawa, 1944). 60 pp., 20 line cuts.

### GENERAL

\*"Sediments and the Search for Oil," by Paul D. Krynine. *Mineral Industries*, Vol. 13, No. 3 (State College, Pennsylvania, December, 1943), pp. 1, 3, 4; 4 figs.

\*"Deeper Drilling Prospects in the Mid-Continent," by A. R. Denison. *Oil Weekly*, Vol. 112, No. 8 (Houston, January 24, 1944), pp. 20-26; 5 figs. Reprinted from *A.I.M.E. Petroleum Technology* (November, 1943).

\*"Dip and Strike from Three Not Parallel Drill Cores Lacking Key Beds," by Walter H. Bucher. *Econ. Geol.*, Vol. 38, No. 8 (Lancaster, Pennsylvania, December, 1943), pp. 648-57; 5 figs.

\*"Lower Mississippi Valley Loess," by Richard Joel Russell. *Bull. Geol. Soc. America*, Vol. 55, No. 1 (New York, January 1, 1944), pp. 1-40; 3 pls.

\**Bibliography and Index of Geology Exclusive of North America*, Vol. 9 (1941-1942), by John M. Nickles, Marie Siegrist, and Eleanor Tatge. *Geol. Soc. America* (1943). 450 pp.

\*"Wildcatter Must Reckon with S.E.C.," by Walter E. Hopper. *Oil Weekly*, Vol. 112, No. 10 (Houston, February 7, 1944), p. 13.

\**International Geological Congress Report of the XVIII Session* (The Union of Soviet Socialist Republics, 1937) (Moscow, 1939; volumes received in 1944). In English, French, and German. Bound dimensions approx. 7×10 inches.

Vol. 1. 639 pp., illus. Membership List; Minutes of Commissions Meetings; Reports of the General Assembly; Geology of Coal Fields.

Vol. 2. 659 pp., illus. Pre-Cambrian; Tectonics of Asia.

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#### KANSAS

\*"Geology and Ground-Water Resources of Hamilton and Kearney Counties, Kansas," by Thad G. McLaughlin. *Kansas Geol. Survey Bull.* 49 (Lawrence, December, 1943). 220 pp., 17 pls., 18 figs., 21 tables.

#### MISSOURI

"Stratigraphy and Fauna of the Louisiana Limestone of Missouri," by James Steele Williams. *U. S. Geol. Survey Prof. Paper* 203 (1944), 133 pp., 9 pls., 9 figs. Supt. Documents, Govt. Printing Office, Washington, D. C. Price, \$0.50.

#### NEW YORK

\*"Stratigraphy of the Genesee Group of New York," by William L. Grossman. *Bull. Geol. Soc. America*, Vol. 55, No. 1 (New York, January 1, 1944), pp. 41-75; 2 pls.

#### UTAH

\*"Geology of the Cretaceous of the Uinta Basin, Utah," by Paul T. Walton. *Bull. Geol. Soc. America*, Vol. 55, No. 1 (New York, January 1, 1944), pp. 91-130; 10 pls., 1 fig.

#### UTAH AND COLORADO

\*"Hydrocarbons of the Uinta Basin of Utah and Colorado." "Review of Geology and Field Work," by Clark F. Barb. "Survey of Bitumen Analyses and Extraction Methods," by James Ogden Ball. *Colorado School Mines Quar.*, Vol. 39, No. 1 (Golden, January, 1944). 115 pp., 2 pls., 19 figs., 26 tables. Price, \$1.50.

#### VIRGINIA AND NORTH CAROLINA

"Mollusca from the Miocene and Lower Pliocene of Virginia and North Carolina, Part 1, Pelecypoda," by Julia Gardner. With a "Summary of the Stratigraphy," by W. C. Mansfield. *U. S. Geol. Survey Prof. Paper* 199A (January, 1944). 178 pp., 23 pls., 4 figs. Supt. Documents, Washington, D. C. Price, \$0.55.

#### WYOMING

\*"Stratigraphy of the Willwood and Tatman Formations in Northwestern Wyoming," by Franklin B. Van Houten. *Bull. Geol. Soc. America*, Vol. 55, No. 2 (New York, February, 1944), pp. 165-210; 7 pls., 4 figs.

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1931	San Antonio	L. P. Garrett <sup>10</sup>	L. C. Decius	Frank R. Clark	F. H. Lahee
1932	Oklahoma City	F. H. Lahee	R. J. Riggs	W. B. Heroy	R. D. Reed <sup>9</sup>
1933	Houston	Frank R. Clark	George Sawtelle	W. B. Heroy	L. C. Snider
1934	Dallas	W. B. Heroy	E. B. Hopkins <sup>11</sup>	M. G. Cheney	L. C. Snider
1935	Wichita	A. I. Levorsen	F. A. Morgan	E. C. Moncrief	L. C. Snider
1936	Tulsa	Ralph D. Reed <sup>9</sup>	C. E. Dobbin	Chas. H. Row	L. C. Snider
1937	Los Angeles	H. B. Fuqua	C. L. Moody	Ira H. Cram	W. A. Ver Wiebe
1938	New Orleans	D. C. Barton <sup>12</sup>	H. W. Hoots	Ira H. Cram	W. A. Ver Wiebe
1939	Oklahoma City	Henry A. Ley	L. M. Neumann	Ed. W. Owen	W. A. Ver Wiebe
1940	Chicago	L. C. Snider	John M. Vetter	Ed. W. Owen	W. A. Ver Wiebe
1941	Houston	Ed. W. Owen	Earl B. Noble	E. O. Markham	W. A. Ver Wiebe
1942	Denver	F. L. Aurin	Paul Weaver	E. O. Markham	W. A. Ver Wiebe
1943	Fort Worth	A. R. Denison	R. W. Clark	R. E. Rettger	Carey Croneis

<sup>1</sup> From March, 1929, to March, 1932, the corresponding office was *first vice-president*.<sup>2</sup> From March, 1929, to March, 1932, the corresponding office was *second vice-president in charge of finances*.<sup>3</sup> From March, 1929, to March, 1932, the corresponding office was *third vice-president in charge of editorial work*.<sup>4</sup> Died, November 25, 1927.<sup>6</sup> Died, January 3, 1940.<sup>8</sup> Died, January 10, 1939.<sup>5</sup> Died, July 9, 1943.<sup>7</sup> Died, November 5, 1932.<sup>9</sup> Died, January 29, 1940.<sup>10</sup> Died, December 13, 1943.<sup>11</sup> Died, July 5, 1940.<sup>12</sup> Died, July 8, 1939.

## THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS MEMBERSHIP LIST<sup>1</sup>

MARCH 3, 1944

### HONORARY MEMBERS

The executive committee may from time to time elect as honorary members persons who have contributed distinguished service to the cause of petroleum geology. Honorary members shall not be required to pay dues.—*Sec. 6, Article III, of the Constitution.*

### LIFE MEMBERS

The executive committee may grant life membership to members who have paid their dues and are otherwise qualified.—*Sec. 2, Article III, of the Constitution.*

On the payment of two hundred dollars (\$200.00) any member in good standing shall be declared a life member and thereafter shall not be required to pay annual dues.—*Sec. 2, Article I, of the By-Laws.*

### MEMBERS

Any person engaged in the work of petroleum geology or in research pertaining to petroleum geology or technology is eligible to active membership, provided he is a graduate of an institution of collegiate standing, in which institution he has done his major work in geology, or in sciences fundamental to petroleum geology, and in addition has had the equivalent of three years' experience in petroleum geology or in the application of these other sciences to petroleum geology or to research in petroleum geology or technology; and provided further that in the case of an applicant for membership who has not had the required collegiate or university training, but whose standing in the profession is well recognized, he shall be admitted to membership when his application shall have been favorably and unanimously acted upon by the executive committee, and provided further that these requirements shall not be construed to exclude teachers and research workers in recognized institutions whose work is of such character as in the opinion of the executive committee shall qualify them for membership.

Active members alone shall be known as members.—*Sec. 1, Article III, of the Constitution.*

### ASSOCIATES

Any person having completed as much as thirty hours of geology (an hour shall here be interpreted as meaning as much as sixteen recitation or lecture periods of one hour each, or the equivalent in laboratory) in a reputable institution of collegiate or university standing, or who has done field work equivalent to this, is eligible to associate membership, provided at the time of his application for membership he shall be engaged in geological studies in an institution of collegiate or university standing, or shall be engaged in petroleum geology; and any person who is a graduate of an institution of collegiate standing, in which he has done his major work in sciences fundamental to petroleum geology or petroleum technology, and who has had the equivalent of one year's experience in the application of his science to the study of petroleum geology, shall be eligible to associate membership, provided at the time of his application for membership he shall be engaged in investigations in the broader subject of petroleum geology and technology.

Associate members shall be known as associates.

Associates shall enjoy all the privileges of membership in the Association, save that they shall not hold office, sign applications for membership, or vote; neither shall they have the privilege of advertising their affiliation with the Association in professional cards or professional reports or otherwise.—*Sec. 3, Article III, of the Constitution.*

<sup>1</sup> This list is published for the use of the members and for the information of all who wish to refer to the professional and business affiliations of the members. It is not a mailing address list and it is not intended to be used for circularizing or soliciting purposes. This list does not, with only a few exceptions, reflect the military addresses of those in the armed forces. For a list of those in the armed forces with their last known address, see the January, 1944, *Bulletin*.

## HONORARY MEMBERS

	<i>Date of Election</i>
Campbell, Marius Robinson (d., December 7, 1940).....	Mar. 20, 1934
Darton, Nelson Horatio, U. S. Geological Survey, Washington, D. C.....	Jan. 7, 1938
Decker, Charles Elijah, Univ. of Oklahoma, Norman, Okla.....	Mar. 20, 1927
Dumble, Edwin Theodore (d., January 25, 1927).....	Mar. 27, 1926
Goodrich, Harold Beach, 1628 S. Cincinnati Ave., Tulsa, Okla.....	Aug. 17, 1929
Gould, Charles Newton, Box 88, Norman, Okla.....	Oct. 13, 1943
Harris, Gilbert Dennison, Cornell University, Ithaca, N. Y.....	Mar. 19, 1935
Hill, Robert Thomas (d., July 28, 1941).....	Mar. 27, 1926
Lawson, Andrew Cowper, Univ. of California, Berkeley, Calif.....	Dec. 22, 1937
Mendenhall, Walter Curran, 9 E. Lenox St., Chevy Chase, Md.....	Mar. 19, 1935
Orcutt, William Warren (d., April 27, 1942).....	Mar. 27, 1920
Ordoñez, Ezequiel, Abraham Gonzalez 79, Mexico City, Mexico.....	Dec. 28, 1935
Reed, Ralph Daniel (d., January 29, 1940).....	Sept. 16, 1939
Salisbury, Rollin D. (d., August 15, 1922).....	1919
Schuchert, Charles (d., November 20, 1942).....	Mar. 20, 1934
Smith, George Otis (d., January 10, 1944).....	Mar. 20, 1920
Stille, Hans, Univ. of Berlin, Berlin, Germany.....	Mar. 15, 1937
Taff, Joseph Alexander, 628 Cowper St., Palo Alto, Calif.....	Mar. 20, 1934
Udden, Johan August (d., January 5, 1932).....	Mar. 23, 1927
Ulrich, Edward Oscar (d., February 22, 1944).....	Mar. 17, 1936
van der Gracht, Willem Anton J. M. van Waterschoot (d., September, 1943).....	Mar. 17, 1936
von Hofer, Hans Hofrat (d., February 9, 1924).....	Mar. 26, 1924
White, David (d., February 7, 1935).....	1919
White, Israel Charles (d., November 25, 1927).....	Mar. 27, 1926
Woolnough, Walter George, 340 Collins St., Melbourne, Victoria, Australia.....	Mar. 31, 1941
Wrather, William Embry, U. S. Geological Survey, Washington, D. C.....	Oct. 13, 1943

COMPLETE LIST OF MEMBERS, ASSOCIATES, HONORARY MEMBERS,  
AND LIFE MEMBERS

Honorary.....	12
Life.....	7
Members.....	3,131
Associates.....	962
Total.....	4,112

## EXPLANATION OF SYMBOLS

\* Honorary member. † Life member. ‖ Associate. Members are not marked. The year refers to the date of election to membership.

Abbey, Gerald E., c/o Charles O. Abbey, Rt. 1, Platte City, Mo.....	'42
Abbott, John L., Pritchard & Abbott, Century Bldg., Fort Worth, Tex.....	'27
Abbott, Wayne Rosser, Bay Petroleum Corp., 1006 Brown Bldg., Wichita, Kan.....	'42
Abell, George T., independent, Box 430, Midland, Tex.....	'29
Abernathy, George Elmer, State Geological Survey, Pittsburg, Kan.....	'38
Absher, Kenneth B., independent, Milam Bldg., San Antonio, Tex.....	'25
Absher, William F., Cities Service Oil Co., Bartlesville, Okla.....	'20
Acheson, Cyrus Harold, Imperial Oil Producing Co., 301 Examiner Bldg., Calgary, Alta., Can- ada.....	'39
Achning, Walter J., Rt. 1, Box 51, Colorado Springs, Colo.....	'38
Ackerman, Edgar Dumont, Standard Oil Co. of Venezuela, Caripito, Venezuela, S. A.....	'40
Ackers, A. L., Stanolind Oil & Gas Co., Box 591, Tulsa, Okla.....	'25
Ackley, Kenneth A., Carter Oil Co., 912 Louisiana Natl. Bank Bldg., Baton Rouge, La.....	'38
Acosta-Sarmiento, Gonzalo, Ministerio de Minas y Petroleos, Carrera 13-A, No. 23-52, Bogota, Colombia, S. A.....	'42
Adams, Bradford Clarendon, The Texas Co., 929 S. Broadway, Los Angeles, Calif.....	'41
Adams, Clyde B., 93 Paul Revere Rd., Needham Heights, Mass.....	'41
Adams, Elmo W., Honolulu Oil Corp., 215 Market St., San Francisco, Calif.....	'30

Adams, Frank C., consulting, Rt. 8, Tyler, Tex.....	27
Adams, John Emery, Standard Oil Co. of Texas, Carlsbad, N. Mex.....	29
Adams, Kilburn E., The Texas Co., Box 2420 Tulsa, Okla.....	38
Adams, Robert James, Box 368, Chickasha, Okla.....	42
Adams, Robert Wiley, Box 664, Reseda, Calif.....	42
Adams, W. C., Box 1666, Houston, Tex.....	24
Addington, Harold W., Box 231, LeCompte, La.....	43
Addison, Carl C., Pure Oil Co., 402 Second Natl. Bank Bldg., Saginaw, Mich.....	30
Adkins, W. S., Shell Oil Co., Inc., Box 2099, Houston, Tex.....	20
Adkisson, Albert W., independent, 2019 W. T. Waggoner Bldg., Fort Worth, Tex.....	34
Adler, Joseph L., Independent Prospecting Co., 901 Esperson Bldg., Houston, Tex.....	30
Afshar, Freydoun Azadi, Walker Museum, Univ. of Chicago, Chicago, Ill.....	39
Agee, Flint Humphrey, 606 First Natl. Bank Bldg., Vicksburg, Miss.....	38
Agey, Charles Samuel, Amerada Petroleum Corp., Box 995, Wichita, Kan.....	38
Agnich, Fred J., Geophysical Service, Inc., 1311 Republic Bank Bldg., Dallas, Tex.....	41
Aguerrevere, Pedro I., Apt. 1253, Caracas, Venezuela, S. A.....	24
Aguerrevere, Santiago E., Servicio Tecnico de Minería y Geología, Ministerio de Fomento, Sur 3, No. 94, Caracas, Venezuela, S. A.....	24
Aimer, James D., Arkansas Natural Gas Corp., Drawer 1734, Shreveport, La.....	26
Ainsworth, David, 221 N. Pine Crest, Wichita, Kan.....	23
Aitken, William Ernest, Apt. 2760, Bogota, Colombia, S. A.....	32
Akers, Wilburn Holt, 1029 S. W. Twenty-eighth St., Oklahoma City, Okla.....	41
Akkerman, Richard Pete, Sheffield Steel Corp., Houston, Tex.....	41
Alagood, Robert Henson, Pure Oil Co., Box 479, Corpus Christi, Tex.....	39
Albert, Emil Richard, Jr., Baroid Sales Div., National Lead Co., 502 Tulsa Bldg., Tulsa, Okla.....	42
Albertson, Maurice M., Shell Oil Co., Inc., Box 2099, Houston, Tex.....	20
Albritton, Claude C., Jr., 3436 University Blvd., Dallas, Tex.....	39
Alcorn, Avery Hunt, The Atlantic Refining Co., 1742 Milam Bldg., San Antonio, Tex.....	32
Alcorn, James Munrexx, 5527 Richard Ave., Dallas, Tex.....	42
Alexander, C. I., Magnolia Petroleum Co., Box 780, Tyler, Tex.....	27
Alexander, Clyde Wayne, Phillips Petroleum Co., 302 Millsaps Bldg., Jackson, Miss.....	38
Alexander, Joseph Watrous, Cities Service Oil Co., Box 4577, Capitol Hill Sta., Oklahoma City, Okla.....	43
Alexander, Walter Herbert, Jr., U. S. Geological Survey, 705 City Hall, Houston, Tex.....	42
Allan, John Andrew, Univ. of Alberta, Edmonton, Alta., Canada.....	30
Allan, Thomas H., consulting, 921 Union Natl. Bank Bldg., Wichita, Kan.....	24
Allardyce, Robert L., Jr., Stanolind Oil & Gas Co., Box 246, Gueydan, La.....	42
Allen, Alton C., Rowan & Nichols Oil Co., 903 Commercial Standard Bldg., Fort Worth, Tex.....	35
Allen, Bryant W., Gulf Oil Corp., Box 778, Tyler, Tex.....	25
Allen, Charles Francis, Western Geophysical Co., Box 807, Brenham, Tex.....	42
Allen, Devere F., Skelly Oil Co., 301 Insurance Bldg., Topeka, Kan.....	29
Allen, Donald M., Westgate-Greenland Oil Co., 1022 Union Natl. Bank Bldg., Wichita, Kan.....	24
Allen, E. G., consulting, 6745 Avalon Ave., Dallas, Tex.....	17
Allen, Frank Tilbury, Gulf Research & Development Co., Box 2038, Pittsburgh, Pa.....	39
Allen, Fraser Hall, Univ. of Texas, Box 1628, Austin, Tex.....	43
Allen, Harris Hayes, Phillips Petroleum Co., Bartlesville, Okla.....	39
Allen, John O., Apt. 172, Maracaibo, Venezuela, S. A.....	41
Allen, Stanlev R., Humble Oil & Refining Co., 202 Humble Bldg., Houston, Tex.....	35
Allen, William Hammond, A.P.O. 7, c/o Postmaster, San Francisco, Calif.....	40
Allen, William Odis, Jr., 1331 E. Twenty-sixth St., Tulsa, Okla.....	39
Allison, A. P., Sun Oil Co., Box 2645, Houston, Tex.....	21
Allon, Meyer Michael, Gulf Research & Development Co., Box 2038, Pittsburgh, Pa.....	37
Alpha, Andrew G., General Petroleum Corp. of California, Box 545, Choteau, Mont.....	43
Alquist, Francis Nelson, 2416 Manon Dr., Midland, Mich.....	38
Alvarado, Benjamin, Servicio Geologico Nacional, Ministerio de Minas y Petroleos, Carrera No. 66-30, Bogota, Colombia, S. A.....	38
Alvarez, Manuel, Jr., Nogal 52, Mexico, D. F., Mexico.....	36
Ambrose, A. W., Cities Service Oil Co., Box 395, Bartlesville, Okla.....	19
Ames, Edward W., Strategic Metals Div., U. S. Bureau of Mines, Denver, Colo.....	19
Andersen, Harold V., 2104 Park, Houston, Tex.....	40
Anderson, Carl B., Gulf Refining Co., Box 482, Mattoon, Ill.....	19
Anderson, Carl C., U. S. Bureau of Mines, Box 2529, Amarillo, Tex.....	32
Anderson, Carl T., Republic Natural Gas Co., 1505 Federal St., Dallas, Tex.....	41
Anderson, Frank M., California Academy of Sciences, San Francisco, Calif.....	24
Anderson, Frank Marion, 1635 Pine St., Dallas, Tex.....	42

Anderson, George Harold, Nordstrom Oil Co., Esperson Bldg., Houston, Tex.	40
Anderson, Howard T., Standard Oil Co. of California, Los Angeles, Calif.	44
Anderson, Jack Q., The Texas Co., 1700 Nineteenth St., Bakersfield, Calif.	40
Anderson, James B., 415 W. Lomita Ave., Glendale, Calif.	38
Anderson, John G., Jr., consulting, 815 Chronicle Bldg., Houston, Tex.	21
Anderson, Kenneth Clyde, 901 E. Linwood, Kansas City, Mo.	42
Anderson, Oscar Samuel, Jr., Big Four Petroleum Co., Box A, Oilton, Okla.	39
Anderson, Ray Ball, Columbian Carbon Co., Box 873, Charleston, W. Va.	24
Anderson, Richard Jasper, Republic Mining & Manufacturing Co., 230 Park Ave., New York, N. Y.	42
Anderson, Robert G., consulting, 519 Mims Bldg., Abilene, Tex.	38
Anderson, Rudolph F., Gulf Refining Co., Box 482, Mattoon, Ill.	42
Anderson, Thomas Corwin I., 2250 Parnell Ave., W. Los Angeles, Calif.	40
Anderson, Tom A., Carter Oil Co., Box 801, Tulsa, Okla.	36
Anderson, Warren D., Amerada Petroleum Corp., Box 591, Midland, Tex.	27
Andrau, Evert Willem Karel, Box 2408, Houston, Tex.	32
Andrews, David Arthur, U. S. Geological Survey, N. Interior Bldg., Washington, D. C.	44
Andrews, Philip, Socony-Vacuum Oil Co. Apt. 1140, Bogota, Colombia, S. A.	25
Andrews, Thomas Gayleon, Univ. of Alabama, University, Ala.	37
Andrews, Wilton W., Humble Oil & Refining Co., 863 Humble Bldg., Houston, Tex.	36
Anisgard, Harry W., 34917028, 6th Photo Comp. Sqn., Peterson Field, Colorado Springs, Colo.	41
Apfel, Earl T., 210 Buffington Rd., Syracuse, N. Y.	29
Applin, Paul L., consulting, 2317 W. Magnolia, Fort Worth, Tex.	19
Archie, Gustave Erdman, Shell Oil Co., Inc., Box 2099, Houston, Tex.	38
Arellano, A. R. V., Apt. 7527, Mexico, D. F., Mexico.	38
Argabrite, William Graeme, consulting, Box 33, Lewisburg, W. Va.	28
Arick, Millard B., Midland, Tex.	27
Arleth, Karl, Standard Oil Co. of California, San Marino, Calif.	39
Armstrong, Earle N., Shamrock Oil & Gas Corp., Amarillo, Tex.	33
Armstrong, Harold K., Richfield Oil Corp., 502 Richfield Bldg., Los Angeles, Calif.	27
Armstrong, J. M., consulting, Box 990, Midland, Tex.	18
Armstrong, Ursel Sidney, Shell Oil Co., Inc., Box 290, Long Beach, Calif.	42
Arnold, Emmett L., A.P.O. 832, c/o Postmaster, New Orleans, La.	27
Arnold, Harry H., Jr., 131 Seventh Ave., Clarion, Pa.	27
Arnold, Henry C., British-American Oil Producing Co., 505 Philtower Bldg., Tulsa, Okla.	30
Arnold, Lincoln Merchant, Geologic Standards Co., 321 S. Detroit, Tulsa, Okla.	39
Aronson, Sam M., independent, 1408 Magnolia Bldg., Dallas, Tex.	24
Arper, William B., Jr., Apt. 2E, 703 W. Nevada, Urbana, Ill.	41
Ashauer, Hans F., 648 1/2 Van Ness Ave., Coalinga, Calif.	37
Ashley, Burton Edward, consulting, 856 Porter Ave., Wichita, Kan.	37
Ashley, Richard Moore, The Atlantic Refining Co., Box 871, Midland, Tex.	39
Ashmore, Leland Wayne, Magnolia Petroleum Co., Box 633, Midland, Tex.	44
Aszklar, Stanley J., Gulf Research & Development Co., Box 2038, Pittsburgh, Pa.	43
Athy, Lawrence F., Continental Oil Co., Ponca City, Okla.	26
Atwater, Gordon I., c/o William Helis, 912 Whitney Bldg., New Orleans, La.	38
Atwill, E. R., Union Oil Co. of California, 617 W. Seventh, Los Angeles, Calif.	31
Augenthaler, Robert Lewis, Standard Oil Co. of British Columbia, 700 Lancaster Bldg., Calgary, Alta., Canada.	38
Aurand, Harry A., consulting, 1350 Bellaire St., Denver, Colo.	26
Aurin, Fritz L., Southland Royalty Co., 1607 Commercial Standard Bldg., Fort Worth, Tex.	17
Austin, Robert Burton, 631 W. Fifty-ninth St., Kansas City, Mo.	41
Autry, Vernon E., consulting, 1915 Republic Bank Bldg., Dallas, Tex.	26
Avery, C. Dwight, U. S. Geological Survey, 3240 Federal Works Bldg., Washington, D. C.	28
Aycock, Lester Charles, State Geological Survey, University Sta., Baton Rouge, La.	41
Ayers, Floyd M., c/o R. M. Hurt, International Petroleum Co., Ltd., Guayaquil, Ecuador, S. A.	30
Babin, Logan Henry, Higgins Industries, Industrial Canal, New Orleans, La.	38
Bace, A. C., Stanolind Oil & Gas Co., Stanolind Bldg., Tulsa, Okla.	24
Backman, Ford Frederick, 0-375608, 4th Sch. Sqn., B.A.A.F., Ft. Myers, Fla.	41
Back, Denys Howard, 3918 Brandt, Houston, Tex.	37
Backman, John Edward, Gulf Research & Development Co., Box 2038, Pittsburgh, Pa.	39
Bacon, Charles S., Jr., U. S. Geological Survey, Pioche, Nev.	29
Baddley, Elmer R., The Texas Co., Los Angeles, Calif.	36
Bader, Glenn Ernest, Humble Oil & Refining Co., 802 Humble Bldg., Houston, Tex.	34
Baer, Daurice Frank, c/o Jasper A. Baer, Monticello, Ind.	42

Baggelaar, Hermanus, Caribbean Petroleum Co., Apt. 19, Maracaibo, Venezuela, S. A.	42
Bailey, Clarence G., Shell Oil Co., Inc., Box 166, Evergreen, Ala.	43
Bailey, James P., Standard Oil Co. of California, 605 W. Olympic Blvd., Los Angeles, Calif.	31
Bailey, John James, Argo Oil Corp., Box 1814, Midland, Tex.	37
Bailey, Thomas L., Shell Oil Co., Inc., Box 2099, Houston, Tex.	24
Bailey, Willard F., Skelly Oil Co., 505 First Natl. Bank Bldg., Midland, Tex.	35
Bain, H. Foster, Tomochonck Ranch, Steamboat, Nev.	26
Baird, Chester A., 4220 Winchester Pike, Canal Winchester, Ohio	21
Baker, Arthur A., U. S. Geological Survey, Washington, D. C.	21
Baker, Norval E., Petroleum Administration for War, Rm. 1104, 122 E. Forty-second St., New York, N. Y.	30
Baker, Raymond F., The Texas Co., 135 E. Forty-second St., New York, N. Y.	27
Baker, William A., Jr., consulting, 1515 Esperson Bldg., Houston, Tex.	17
Bakke, W. E., First Natl. Bank, St. Louis, Mo.	24
Baldwin, Benjamin F., Stanolind Oil & Gas Co., 429 Masonic Bldg., Shawnee, Okla.	28
Baldwin, E. B., 3609 Porter Ave., El Paso, Tex.	39
Baldwin, Harry L., Jr., Phillips Petroleum Co., Bartlesville, Okla.	29
Bale, Hubert E., consulting, 501 Apco Tower, Oklahoma City, Okla.	22
Ball, John Rice, Dept. of Geology, Northwestern University, Evanston, Ill.	24
Ball, Max W., consulting, First Natl. Bank Bldg., Denver, Colo.	40
Ballantyne, Richard Stewart, Jr., 1530 S. Van Ness Ave., Los Angeles, Calif.	19
Ballard, Gene, Seaboard Oil Co., Box 396, Kerman, Calif.	40
Ballard, James L., 2811 S. Cincinnati, Tulsa, Okla.	40
Ballard, William Norval, consulting, 826 N. E. Eighteenth St., Oklahoma City, Okla.	25
Baltusaitis, Edward Joseph, Gulf Refining Co., Box 811, Saginaw, Mich.	29
Banks, Thomas R., consulting, 1021 W. Craig Pl., San Antonio, Tex.	40
Banta, Henry Eugene, Independent Exploration Co., Houston, Tex.	27
Barbat, William F., Standard Oil Co., Taft, Calif.	40
Barber, Clifford F., consulting, 1217 Commerce Bldg., Houston, Tex.	28
Barbour, Richard Morton, 129 E. Riverside Dr., Evansville, Ind.	37
Barclay, Stewart, Phillips Petroleum Co., Bartlesville, Okla.	40
Bard, Richards J., Bryn Mawr, Pa.	39
Barger, Thomas Charles, California Arabian Standard Oil Co., Bahrein Island, Persian Gulf.	28
Barker, Maurice Hubert Stucley, Anglo-Egyptian Oil Fields, Ltd., Shell House, Box 228, Shari'a Cherifein, Cairo, Egypt	40
Barling, Robert, Cities Service Oil Co., Box 779, Tyler, Tex.	42
Barlow, Victor, Burneol Petroleum Co., 812 Subway Terminal Bldg., Los Angeles, Calif.	27
Barnes, Augustine Edward, Jr., The Ohio Oil Co., Midland, Tex.	27
Barnes, Chester F., Cosden Petroleum Corp., Big Spring, Tex.	42
Barnes, Roy M., Continental Oil Co., Edison Bldg., 601 W. Fifth St., Los Angeles, Calif.	35
Barnes, Sydney U., Apt. 214, 1819 G St., N. W., Washington, D. C.	24
Barnett, D. G., Union Producing Co., Beeville, Tex.	41
Barnett, John Abner, U. S. Geological Survey, Box 997, Roswell, N. Mex.	25
Barnett, John F., Jr., Palacios, Tex.	28
Barney, Arthur Y., Box 873, Charleston, W. Va.	39
Barnhart, Carl F., Amerada Petroleum Corp., Box 591, Midland, Tex.	30
Barnwell, George F., New Zealand Petroleum Co., Box 295, Gisborne, N. Z.	29
Barr, Kenneth William, Trinidad Leaseholds, Ltd., Pointe-a-Pierre, Trinidad, B. W. I.	28
Barragy, Edward J., Woodley Petroleum Co., Second Natl. Bank Bldg., Houston, Tex.	39
Barret, William M., c/o William M. Barret, Inc., Giddens-Lane Bldg., Shreveport, La.	31
Barrett, Albert F., General Petroleum Corp., Casper, Wyo.	32
Barrett, Henry Haldred, Carter Oil Co., Box 411, Bowie, Tex.	30
Barrett, John Frederick, Barnsdall Oil Co., Houston, Tex.	41
Barrow, Geoffrey, Tropical Oil Co., Bogota, Colombia, S. A.	40
Barrow, Leonidas T., Humble Oil & Refining Co., Houston, Tex.	28
Barry, John O'Keefe, 701 Meriam St., Plaquemine, La.	31
Bartell, Laurence D., Skelly Oil Co., 419 Ardis Bldg., Shreveport, La.	22
Bartle, Glenn G., 302 Ogden, Swarthmore, Pa.	41
Bartlett, C. Lothrop, Sun Oil Co., Box 2831, Beaumont, Tex.	27
Bartlett, Fred W., c/o William Bartlett, Rt. 2, Syracuse, N. Y.	28
Bartley, Jerald Howard, Box 2053, Glen Rose, Tex.	24
Barton, Jack M., Magnolia Petroleum Co., Box 633, Midland, Tex.	39
Barton, Louis A., Arkansas Natural Gas Corp., 1128 Slatery Bldg., Shreveport, La.	38
Bartosh, Edmund J., Bankline Oil Co., 437 S. Hill St., Los Angeles, Calif.	20
Bartram, John G., Stanolind Oil & Gas Co., Box 591, Tulsa, Okla.	28

Bartram, Paul L., Phillips Petroleum Co., Box 958, Ardmore, Okla.	27
Barwick, John S., consulting, 703 Union Natl. Bank Bldg., Wichita, Kan.	24
Bass, Nathan W., U. S. Geological Survey, 314 Boston Bldg., Denver, Colo.	25
Bass, Perry R., Perry R. Bass, Inc., 2105 Fort Worth Natl. Bank Bldg., Fort Worth, Tex.	36
Bassett, Charles F., Gulf Oil Corp., Box 1166, Pittsburgh, Pa.	28
Bateman, Alan M., Yale University, Drawer 91-A, Yale Sta., New Haven, Conn.	20
Bateman, Andrew Frank, Jr., 227 E. Fourth St., Loveland, Colo.	36
Bateman, Paul C., U. S. Geological Survey, Bishop, Calif.	42
Bates, Charles Carpenter, 1802 B St., Lincoln, Neb.	40
Bates, Fred W., consulting, Box 175, Lafayette, La.	36
Bates, Robert Latimer, New Mexico School of Mines, Socorro, N. Mex.	40
Bates, Robert Paul, independent, Springer Bldg., Tulsa, Okla.	30
Batla, Thomas Woodrow, Bellville, Tex.	41
Bauernschmidt, A. J., Jr., Magnolia Petroleum Co., Box 111, Houston, Tex.	27
Baughman, George W., Cessna Aircraft Co., Wichita, Kan.	36
Baum, Robert, Seismograph Service Corp., 709 Kennedy Bldg., Tulsa, Okla.	43
Baxter, John C., O-349266, A.P.O. 4774, c/o Postmaster, New York, N. Y.	42
Bay, Harry X., The Texas Co., Box 252, New Orleans, La.	30
Bayer, H. M., Gulf Oil Corp., Box 1150, Midland, Tex.	25
Bayle, Pierre, Dale Service Corp., 932 M. & M. Bldg., Houston, Tex.	31
Bayles, Robert Ellery, Peoples Natural Gas Co., 545 William Penn Way, Pittsburgh, Pa.	42
Baysinger, Eugene M., Box 210, Lake Charles, La.	36
Bazhaw, Willis Oliver, Petty Geophysical Engineering Co., Shawnee, Okla.	42
Beach, Hugh Hamilton, McColl Frontenac Oil Co., Ltd., 707 Lancaster Bldg., Calgary, Alta., Canada	41
Beach, John Hartwell, consulting, 21 Kern County Land Bldg., Bakersfield, Calif.	37
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Beeker, Ralph Edward, Pure Oil Co., Saginaw, Mich.	41
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Brewer, John Edward, Lario Oil & Gas Co., 301 S. Market, Wichita, Kan.....	43
Brewer, Ralph Roche, Jr., Stanolind Oil & Gas Co., Box 152, Oberlin, Kan.....	42
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Brier, Ervin E., Continental Oil Co., La Grange, Tex.....	42
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Brooks, Benton Snow, Jr., Shell Oil Co., Inc., Wichita, Kan.....	39
Brooks, Frank M., Bridgeport Oil Co., 400 Brown Bldg., Wichita, Kan.....	36
Brooks, Olin D., Humble Oil & Refining Co., Dallas, Tex.....	30
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Broussard, David Franklin, Independent Exploration Co., 901 Esperson Bldg., Houston, Tex.....	38
Broussard, Lloyd J., c/o Kenneth Dale Owen, 2402 Esperson Bldg., Houston, Tex.....	38
Broussard, Marion Ursin, Superior Oil Co., Houston, Tex.....	43
Brouwer, Luitzen Egbertus Jan, Bataafsche Petroleum Mij., Hoofdvertegenwoordiging, Batavia, Java, N. E. I.....	38
Brown, Augustus Bart, Mudge Oil Co., 1500 Gulf States Bldg., Dallas, Tex.....	37
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Chaddick, William Monroe, Jr., Plano, Tex.....	35
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Davies, James Dudley, Shell Oil Co., Inc., Wichita Falls, Tex.	39
Davies, Nathan C., c/o Bell Brothers, Robinson, Ill.	29
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Davis, Gene O., 9715 E. Sixteenth St., Independence, Mo.	42
Davis, Horace Chesterfield, The Texas Co., Wichita, Kan.	39
Davis, Irion Grady, Mene Grande Oil Co., Apt. 709, Caracas, Venezuela, S. A.	38
Davis, John Harvey, The Ohio Oil Co., Sheridan, Wyo.	42
Davis, John Roland, Superior Oil Co., 807 Hamilton Bldg., Wichita Falls, Tex.	39
Davis, Leon Virgil, 806 Merrick St., Henryetta, Okla.	38
Davis, Lon, Jr., Floydada, Tex.	42
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Davis, Robert J., Shell Oil Co., Inc., 50 W. Fiftieth, New York, N. Y.	21
Davis, Roger Hugh, Drilling & Exploration Co., 804 Continental Bldg., Dallas, Tex.	40
Davis, Sidney H., Ozark Chemical Co., Tulsa, Okla.	36
Davis, Thornton, Peerless Oil & Gas Co., Alamo Natl. Bldg., San Antonio, Tex.	25
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Dickerson, Charles Herbert, Hotel Premier, Crowell, Tex.	42
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FitzGerald, Norman D., Great Lakes Carbon Corp., 22 E. Fortieth St., New York, N. Y.	44
Fitzgerald, Paul E., Dowell, Inc., 529 Kennedy Bldg., Tulsa, Okla.	30
Fitzgerald, Thomas J., Richfield Oil Corp., 560 Haberfelde Bldg., Bakersfield, Calif.	29
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Fletcher, Claude Osborne, Union Producing Co., Box 711, Beeville, Tex.	36
Flowers, Jackson Jefferson, Humble Oil & Refining Co., 256 Humble Bldg., Houston, Tex.	38
Floyd, Florin W., Standard Oil Co. of Venezuela, Apt. 1249, Caracas, Venezuela, S. A.	23
Flude, John William, 602 Second St., S., Columbus, Miss.	37
Fly, Paul J., Mar-Tex Oil Co., 2405 Esperson Bldg., Houston, Tex.	31
Fohs, F. Julius, c/o Fohs Oil Co., Esperson Bldg., Houston, Tex.	17
Foley, Edward J., Imperial Oil Co., Ltd., Canol Project, Box 129, Edmonton, Alta., Canada	38
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Folk, Stewart, Magnolia Petroleum Co., Champaign, Ill.	40
Folsom, Lucas Wendell, State Geological Survey, Morgantown, W. Va.	40
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Forcade, Kirk Charles, Phillips Petroleum Co., First Natl. Bank Bldg., Oklahoma City, Okla.	43
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Forrest, Lesh C., 1655 G St., Bakersfield, Calif.....	38
Forsyth, Roderick James, Case, Pomeroy & Co., Inc., Box 376, Tulsa, Okla.....	38
Fortier, Leo R., Alpine Oil & Royalty Co., Inc., Wichita, Kan.....	25
Fortine, Dwight H., Barnsdall Oil Co., Petroleum Bldg., Los Angeles, Calif.....	30
Forward, Frederick William, Phillips Petroleum Co., Box 547, Plaquemine, La.....	43
Fosdick, Arthur R., Luse & Fosdick Drilling Co., Dallas, Tex.....	32
Fossa-Mancini, Enrico, Museo de la Plata, La Plata, Argentina, S. A.....	31
Fossage, Ernest Willard, Shell Oil Co., Inc., Box 1191, Tulsa, Okla.....	37
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Foster, Paul Woodward, The Atlantic Refining Co., Box 2819, Dallas, Tex.....	42
Fountain, Henry Coleman, Magnolia Petroleum Co., Box 507, Pearsall, Tex.....	40
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Fouts, John M., Jr., 123 N. Rosemont, Dallas, Tex.....	38
Fowler, Charles W., Jr., Pantepec Oil Co., Apt. 23, Maturin, Venezuela, S. A.....	26
Fowler, George M., consulting, 608 Joplin Natl. Bank Bldg., Joplin, Mo.....	23
Fowler, Henry Florey, Box 215, Mt. Pleasant, Tex.....	42
Fowler, William James, McKanna, Inc., 314 City Natl. Bldg., Wichita Falls, Tex.....	42
Fox, Frederick Glen, Imperial Oil Co., Ltd., Box 330, Moose Jaw, Sask., Canada.....	43
Fox, James P., The California Co., 1818 Canal Bldg., New Orleans, La.....	29
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Franklin, Donald Wilbert, The Ohio Oil Co., Bloomington, Ind.....	42
Franklin, Louis, Franklin & Tidemann, Ltd., 1403 Mellie Esperson Bldg., Houston, Tex.....	20
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Frazell, William David, Union Producing Co., Riesel, Tex.....	38
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Freeman, Louise Barton, Department of Mines & Minerals, Lexington, Ky.....	41
Freie, A. J., Lago Petroleum Corp., Apt. 889, Caracas, Venezuela, S. A.....	28
Frey, Alfred P., Shell Oil Co., Inc., Centralia, Ill.....	24
Frink, John Westlake, Tennessee Valley Authority, Chattanooga, Tenn.....	38
Frisknecht, Gustav, Stapferstrasse 39, Zurich 6, Switzerland.....	35
Fritts, Harold M., Shell Oil Co., Inc., Houston, Tex.....	26
Fritz, William Clayton, independent, 1910 W. College St., Midland, Tex.....	35
Frizzell, Donald Leslie, c/o T. J. Frizzell, 5638 Twelfth Ave., N. E., Seattle, Wash.....	40
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Fryou, Joe A., Box 1268, Bay City, Tex.....	40
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Fuellhart, Donald E., Brokaw, Dixon & McKee, Natchitoches, La.....	29
Fugate, Ross James, Sun Oil Co., Clare, Mich.....	40
Fulk, Frank Floyd, Stanolind Oil & Gas Co., Houston, Tex.....	43
Fuller, Melville Weston, Carter Oil Co., Box 801, Tulsa, Okla.....	36
Fulton, Loris J., Pure Oil Co., 507 University Bldg., Denver, Colo.....	29
Funk, Fred J., The Ohio Oil Co., Findlay, Ohio.....	28
Funk, Marion H., Sun Oil Co., Box 424, Midland, Tex.....	24
Funkhouser, E. M., Woodley Petroleum Co., Box 75, Midland, Tex.....	36
Funkhouser, Harold John, Mene Grande Oil Co., Apt. 45, Barcelona, Venezuela, S. A.....	39
Fuqua, H. B., Gulf Oil Corp., Box 1290, Fort Worth, Tex.....	20
Fuqua, Marjorie Charline, Humble Oil & Refining Co., Humble Bldg., Houston, Tex.....	40
Furnival, George Mitchell, Dominion Oil Co., 700 Lancaster Bldg., Calgary, Alta., Canada.....	43
Fyfe, Douglas, Arenales 1423, Lima, Peru, S. A.....	20
Gabelman, John W., Gilman, Colo.....	43
Gaby, Edwin D., Geophysical Service, Inc., New Orleans, La.....	40
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Gaddess, Gene, Pure Oil Co., Olney, Ill.....	43
Gaddess, Jack, Production Engineer, North Pennsylvania Gas Co., Port Allegany, Pa.....	25
Gaenslen, George, Amerada Petroleum Corp., Midland, Tex.....	38

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Gester, Stephen H., Standard Oil Co. of California, 1128 Standard Oil Bldg., San Francisco, Calif.	21
Getzendaner, A. E., Gulf Oil Corp., Drawer 2100, Houston, Tex.	24
Getzendaner, Frank M., Yellville, Ark.	21
Geyer, Richard A., Magnetic Ranges, Naval Operating Base, Newport, R. I.	43
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Gibbs, James F., Standard Oil Co. of Texas, Box 1249, Houston, Tex.	27

Gibson, Donald Thomas, 2008 Twenty-sixth St., Lubbock, Tex.....	38
Gibson, George Drew, Anchor Exploration Co., 2009 First Natl. Bldg., Oklahoma City, Okla.....	37
Gibson, George Randall, Richfield Oil Corp., Box 103, Midland, Tex.....	43
Gibson, Howard A., 9939 One-Hundred Seventh St., Edmonton, Alta., Canada.....	42
Gibson, Worth C., Jr., British Oil Producing Co., 632 Waggoner Bldg., Wichita Falls, Tex.....	29
Giddings, Harvard, The Texas Co., Box 600, Wichita Falls, Tex.....	26
Gierhart, Guy B., Humble Oil & Refining Co., Box 1271, Corpus Christi, Tex.....	28
Giesey, S. C., Union Oil Co. of California, Midland, Tex.....	36
Giffin, Wilson C., Jasper Petroleum Co., Long Beach, Calif.....	19
Gilbert, A. C., Jr., Devonian Oil Co., 645 Milam Bldg., San Antonio, Tex.....	28
Gilbert, Thomas Harold, Valley Osage Oil Co., 338 Kennedy Bldg., Tulsa, Okla.....	42
Gile, Richard E., consulting, Thomas Bldg., Midland, Tex.....	29
Giles, Albert W., Dept. of Geology, Univ. of Arkansas, Fayetteville, Ark.....	22
Giles, Howard Windfield, Gulf Research & Development Co., Box 2038, Pittsburgh, Pa.....	42
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Gill, Joseph Powers, Sinclair Prairie Oil Co., Ardmore, Okla.....	38
Gill, J. Willard, 2632 Lubbock, Fort Worth, Tex.....	35
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Gillin, John A., National Geophysical Co., Dallas, Tex.....	43
Gillson, Joseph L., E. I. du Pont de Nemours & Co., Rm. 8063, du Pont Bldg., Wilmington, Del.....	30
Gilluly, James, Dept. of Geology, Univ. of California, W. Los Angeles, Calif.....	39
Gilmour, Kathleen K., The Atlantic Refining Co., Magnolia Bldg., Dallas, Tex.....	38
Gilmour, Andrew, Amerada Petroleum Corp., Box 2040, Tulsa, Okla.....	29
Giltinan, George Murray, Seismograph Service Corp., 709 Kennedy Bldg., Tulsa, Okla.....	39
Ginter, Roy LaMont, U. S. Geological Survey, Box 311, Tulsa, Okla.....	33
Girdler, Tom M., Jr., 13851 Clifton Ave., Lakewood, Ohio.....	38
Gisburne, John Robert, 206 Pleasant St., Concord, N. H.....	41
Gish, Wesley G., Transwestern Oil Co., 1600 Milam Bldg., San Antonio, Tex.....	22
Given, Robert J., 3708 E. Douglas Ave., Wichita, Kan.....	39
Glass, Theodore G., Sinclair Prairie Oil Co., 703 Colcord Bldg., Oklahoma City, Okla.....	38
Glass, Wilson Vernon, Stanolind Oil & Gas Co., Box 1540, Midland, Tex.....	43
Gledlie, Joseph, Tillie Sta., Alta., Canada.....	40
Glenn, L. C., Dept. of Geology, Vanderbilt University, Nashville, Tenn.....	19
Glover, Sheldon L., State Division of Mines & Mining, State Capitol, Olympia, Wash.....	38
Godde, Harry Anthony, Signal Oil & Gas Co., Box 5840, Metropolitan Sta., Los Angeles, Calif.....	25
Godefroy, Constant, 120 Oriole Pkwy., Toronto, Ont., Canada.....	43
Goebel, Lawrence A., Carter Oil Co., Drawer 1739, Shreveport, La.....	39
Goerner, Fred Stephen, The California Co., 1818 Canal Bldg., New Orleans, La.....	38
Golden, John Muro, Elfex Co., 1706 Niels Esperson Bldg., Houston, Tex.....	38
Goldschmid, Karl Theodor, Shell Co. of Ecuador, Apt. 340, Quito, Ecuador, S. A.....	41
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Goodman, Clark, Massachusetts Inst. of Technology, 42 Massachusetts Ave., Cambridge, Mass.....	43
Goodman, Herbert M., c/o Frank L. Goodman, Coin, Iowa.....	41
Goodman, John V., Philadelphia Co., 435 Sixth Ave., Pittsburgh, Pa.....	38
Goodman, P. W., 301 Washington Ave., Durant, Okla.....	31
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Goodrich, Paul K., Box 1139, Houston, Tex.....	30
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Goodrich, Robert D., 706 Fort Worth Natl. Bank Bldg., Fort Worth, Tex.....	18
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Gutzwiller, Otto, Bremgarten, Aargau, Switzerland.....	28
Guyod, Hubert, Halliburton Oil Well Cementing Co., Box 2535, Houston, Tex.....	37
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Hamman, John, Jr., Hamman Oil & Refining Co., Houston, Tex.....	30
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Hammonds, George Scott, independent, Hotel Marshall, Marshall, Tex.....	40
Hamner, Edward John, Humble Oil & Refining Co., Humble Bldg., Houston, Tex.....	42
Hamner, Francis Merrick, Douglas Aircraft Co., Tulsa, Okla.....	42
Hampton, James D., McKaskill, Ariz.....	43
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Kilian, Harry, Union Sulphur Co., Inc., Sulphur, La.....	37
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Kimble, James C., General Petroleum Corp., 6 Crites Bldg., Bakersfield, Calif.....	36
King, Charles C., Home-Stake Companies, Philtower Bldg., Tulsa, Okla.....	27
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Leavenworth, Paul B., Gulf Oil Corp., Box 2100, Houston, Tex.....	26
Leavitt, William Bradbury, Amerada Petroleum Corp., 1811 Niels Esperson Bldg., Houston, Tex.....	43
Lebkicher, Roy, Standard Oil Co., Rm. 1202, 225 Bush St., San Francisco, Calif.....	27
LeBlond, Robert Edmond, Tide Water Associated Oil Co., Box 181, Midland, Tex.....	42
LeConte, Joseph, Richfield Oil Corp., 560 Haberfelde Bldg., Bakersfield, Calif.....	38
Ledingham, Glen W., Western Gulf Oil Co., Box 1392, Bakersfield, Calif.....	40
Lee, Clarence L., The Texas Co. of Venezuela, Ltd., Apt. 267, Caracas, Venezuela, S. A.....	31
Lee, Harvey W., Union Oil Co. of California, Union Oil Bldg., 617 W. Seventh St., Los Angeles, Calif.....	40
Lee, Herbert V., 400 E. Twenty-ninth St., Sioux Falls, S. Dak.....	38
Lee, John E., Jr., Kerlyn Oil Co., 2009 First Natl. Bldg., Oklahoma City, Okla.....	42
Lee, Lynn K., Pure Oil Co., Box 2107, Fort Worth, Tex.....	28
Lee, Marvin, consulting, 809 Bitting Bldg., Wichita, Kan.....	17

Lee, Thomas William, Sagamore Oil & Gas Co., Independence, Kan.	43
Lee, Wallace, State Geological Survey, Lawrence, Kan.	20
Leeper, Alan Bertrand, Honolulu Oil Corp., Midland, Tex.	41
Lees, George M., Anglo Iranian Oil Co., Ltd., Britannic House, Finsbury Circus, London, E. C. 2.	31
England	36
Lees, Laurence F., Phillips Petroleum Co., Box 791, Midland, Tex.	26
Lehman, Roy P., Phillips Petroleum Co., Box 152, Shawnee, Okla.	29
Lehner, Ernest J., Burma Oil Co., 25 Warris Rd., Lahore, British India.	18
Leibensperger, Raymond, Standard-Vacuum Oil Co., 26 Broadway, New York, N. Y.	30
Leidhold, Clemens, Gaspar Campos 554, Vicente Lopez, F.C.C.A., Argentina, S. A.	24
Leighton, Morris M., State Geological Survey, 305 Ceramics Bldg., Urbana, Ill.	26
Leiser, J. B., Shell Oil Co., Inc., Box 1191, Tulsa, Okla.	35
Leonard, Clarence Ziegler, U. S. Engineer Field Office, Box 606, Fort Pierce, Fla.	34
Leonardon, E. G., Schlumberger Well Surveying Corp., Box 2175, Houston, Tex.	7
Lepper, G. W., c/o H. M. Petroleum Dept., 2 Dean Stanley St., Westminster, London, S. W. 7.	25
England	42
LeRoy, Frank Leon, Socony-Vacuum Oil Co., Apt. 246, Caracas, Venezuela, S. A.	43
LeRoy, Leslie Walter, Colorado School of Mines, Golden, Colo.	41
LeRoy, Tom E., 417 St. Patrick, Lafayette, La.	44
Lester, Howard H., Shell Oil Co., Inc., 2000 Alamo Natl. Bank Bldg., San Antonio, Tex.	38
Lester, John Lawrence, Shell Oil Co., Inc., Box 476, Centralia Ill.	29
Lester, O. C., Jr., Amerada Petroleum Corp., 552 Subway Terminal Bldg., Los Angeles, Calif.	19
Levorsen, A. I., consulting, 221 Woodward Blvd., Tulsa 5, Okla.	40
Levy, David Jacob, 2217 Huldy St., Houston, Tex.	41
Lewark, James Edward, Carter Oil Co., Mattoon, Ill.	21
Lewis, Frank E., Great Lakes Carbon Corp., Box 746, Midland, Tex.	23
Lewis, J. Volney, Mining Division, War Production Board, Washington, D. C.	23
Lewis, J. Whitney, Dominican Seaboard Oil Co., Inc., Apt. 111, Ciudad Trujillo, Dominican Republic, C. A.	38
Lewis, James A., Core Laboratories, Inc., Box 8066, Dallas, Tex.	19
Lewis, James O., consulting, 1912 Commerce Bldg., Houston, Tex.	44
Lewis, Jerry Burton, The Ohio Oil Co., Box 1168, Tampa, Fla.	42
Lewis, Lloyd Alan, Shell Oil Co., Inc., Box 691, Ventura, Calif.	37
Lewis, Milton W., consulting, Rm. 211, 811 W. Seventh St., Los Angeles, Calif.	30
Lewis, Paul S., Humble Oil & Refining Co., 202 Humble Bldg., Houston, Tex.	36
Lewis, Ray C., Stanolind Oil & Gas Co., Box 3092, Houston, Tex.	42
Lewis, Wendell L., Houston Oil Co., Box 2412, Houston, Tex.	40
Lewis, William Dabney, 1240 Arden Rd., Pasadena, Calif.	19
Ley, Henry A., consulting, 225 W. Elsmere, San Antonio, Tex.	29
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England	33
Liddle, Ralph A., 520 N. Ross Ave., Mexia, Tex.	28
Lilienborg, Burton Armand, consulting, Ritz Bldg., Tulsa, Okla.	21
Lilley, Ernest R., 41 Woodland Park Dr., Tenafly, N. J.	41
Lillibridge, Frederick Stead, Box 101, Cunningham, Kan.	28
Lillibridge, Harry E., Eason Oil Co., Enid, Okla.	40
Lilligren, Jonathan Martin, Sinclair Prairie Oil Co., Box 443, Parkersburg, W. Va.	28
Liming, John A., o-361086, 21st T. D. Grp. Hq., Camp Shelby, Miss.	38
Lincoln, William W., Lincoln Petroleum Corp., Box 193, Lockhart, Tex.	19
Lindberg, George David, Sun Oil Co., Toledo, Ohio.	44
Lindeblad, E. E., Continental Oil Co., Midland, Tex.	41
Lindeblad, Ludvig C., Stanolind Oil & Gas Co., Box 1410, Fort Worth, Tex.	36
Lindner, Joseph Leicht, 822 Stanley Blvd., Ardmore, Okla.	42
Lindsay, Robert English, Associated Oil Co., 891 Pacific Electric Bldg., Los Angeles, Calif.	37
Lindsay, Sidney Afton, 124 Genesee Rd., San Antonio, Tex.	21
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Link, Theodore A., 1201 Prospect Ave., Calgary, Alta., Canada.	39
Link, Walter K., Apt. 1303, Havana, Cuba.	31
Little, Sterling E. William Helis Co., 912 Whitney Bldg., New Orleans, La.	26
Littlefield, Max S., Gulf Oil Corp., Box 661, Tulsa, Okla.	21
Livingston, Noyes B., Y. P. F., Bolivianos Oran, F.C.C.N.A., Casilla No. 7, Salta, Argentina, S. A.	21
Lloyd, Abe M., Sun Oil Co., Box 2880, Dallas, Tex.	
Lloyd, E. Russell, consulting, Box 1026, Midland, Tex.	

Lock, John Henry, 210 Farragut St., Laredo, Tex.....	38
Lockett, George L., Mene Grande Oil Co. C. A., Apt. 45, Barcelona, Venezuela, S. A.....	35
Lockett, J. R., Ohio Fuel Gas Co., 99 N. Front St., Columbus, Ohio.....	28
Lockwood, Robinson P., Gulf Oil Corp., 705 Lancaster Bldg., Calgary, Alta., Canada.....	30
Loeblich, Alfred Richard, Jr., 452 College Ave., Norman, Okla.....	42
Loeblich, Helen Tappan, 452 College Ave., Norman, Okla.....	38
Loeffler, Richard John, Standard Oil Co. of Venezuela, Caripito, Venezuela, S. A.....	40
Loel, Wayne, consulting, 808 Subway Terminal Bldg., Los Angeles, Calif.....	22
Loetterle, Gerald John, Shell Oil Co., Inc., Box 2037, Tyler, Tex.....	33
Long, Carl T., Crestmont Oil Co., 674 Subway Terminal Bldg., Los Angeles, Calif.....	25
Longmire, William R., Gulf Oil Corp., Box 106, Indianapolis, Ind.....	20
Longwell, Chester R., Dept. of Geology, Yale University, New Haven, Conn.....	27
Lonsdale, John T., c/o B. C. Lonsdale, Winfield, Iowa.....	29
Loofbourov, John Stewart, Jr., 712 S. Citrus, Los Angeles, Calif.....	40
Loomis, Frederic Brewster, Jr., U. S. Naval Air Station, Houma, La.....	41
Loring, Ralph Crapo, 703 Fourth Ave., Asbury Park, N. J.....	37
Loskamp, Alvin P., Union Oil Co. of California, 1214 Petroleum Bldg., Midland, Tex.....	25
Lott, Alfred Walker, Pan-American Producing Co., Mellie Esperson Bldg., Houston, Tex.....	41
Lott, Frederick S., Naval Ordnance Laboratory, U. S. Navy Yard, Washington, D. C.....	30
Louderback, George D., Dept. of Geology, Bacon Hall, Univ. of California, Berkeley, Calif.....	25
Loughlin, Gerald F., U. S. Geological Survey, Washington, D. C.....	37
Lounsbery, D. E., Phillips Petroleum Co., Bartlesville, Okla.....	21
Love, John David, U. S. Geological Survey, Science Hall, Univ. of Wyoming, Laramie, Wyo.....	39
Love, Perry R., Magnolia Petroleum Co., Box 900, Dallas, Tex.....	30
Lovejoy, J. B., Gulf Oil Corp., Box 1290, Fort Worth, Tex.....	27
Lovejoy, John M., Seaboard Oil Co. of Delaware, 39 Broadway, New York, N. Y.....	24
Lovely, Herbert Richard, Anglo-American Oil Co., Ltd., 32 Market Square, East Retford, Notts., England.....	40
Lovering, T. S., Box 115, Eureka, Utah.....	31
Low, Julian W., The California Co., 502 Union Natl. Bank, Wichita, Kan.....	40
Lowman, Shepard W., Shell Oil Co., Inc., 641 M. & M. Bldg., Houston, Tex.....	26
Lozo, Francis Edgar, Jr., Shell Oil Co., Inc., 641 M. & M. Bldg., Houston, Tex.....	39
Lucke, John B., Beach Hall, Univ. of Connecticut, Storrs, Conn.....	30
Lucky, M. C., independent, 1912 Albans, Houston, Tex.....	26
Lueth, Clinton A., 423 University Ave., San Antonio, Tex.....	41
Lugn, A. L., 1800 S. Twenty-fourth St., Lincoln, Neb.....	31
Lukert, Louis H., The Texas Co., Box 2420, Tulsa, Okla.....	36
Luman, Edmondson D., Rt. 4, Box 94, Okemah, Okla.....	24
Lund, Gage V., The California Co., 1818 Canal Bldg., New Orleans, La.....	27
Lund, Wesley R., 3042 S. Detroit, Tulsa, Okla.....	40
Lupton, Benjamin Charles, General Petroleum Corp., 6 Crites Bldg., Bakersfield, Calif.....	38
Lyle, William Eugene, Jr., 1611 Ninth St., Lubbock, Tex.....	40
Lynch, Shirley Alfred, Dept. of Geology, North Texas Agricultural College, Arlington, Tex.....	34
Lynn, Robert H., independent, 1101 Petroleum Bldg., Oklahoma City, Okla.....	21
Lynton, Edward D., 1221 N. Isabel St., Glendale, Calif.....	23
Lyons, Percy Marvin, State Geological Survey, Louisiana State University, Baton Rouge, La.....	43
Lyons, Richard T., Tide Water Associated Oil Co., Box 1404, Houston, Tex.....	22
Lytel, Harvey M., Socony-Vacuum Oil Co., 62 Sharia Ibrahim Pasha, Cairo, Egypt.....	28
Lytle, J. Edward, Union Producing Co., Box 1407, Shreveport, La.....	31
MacDonald, Erwin H., 4161 Vantage Ave., Studio City, Calif.....	23
MacDonell, James A., Highlands Oil Co., Lima, Ohio.....	25
MacGregor, James Donald, Tropical Oil Co., Villavicencio, Colombia, S. A.....	42
Mackay, Donald K., Petroleum Division, Foreign Economic Administration, Washington, D. C.....	25
Mackay, Hugh, consulting, 216 S. Oak St., Sapulpa, Okla.....	17
Mackenzie, Andrew N., Petroleum Administration for War, Washington, D. C.....	22
Mackenzie, William Donald Cossar, Imperial Oil Co., Ltd., Box 129, Edmonton, Alta., Canada.....	37
MacNaughton, Lewis W., DeGolyer, MacNaughton & McGhee, 1000 Continental Bldg., Dallas, Tex.....	26
MacNeil, Donald J., Univ. Post Office, Box 26, Antigonish, Nova Scotia, Canada.....	38
MacNeil, F. Stearns, U. S. National Museum, Washington, D. C.....	43
MacQuown, William C., Jr., Magnolia Petroleum Co., Mt. Vernon, Ill.....	43
Macready, George A., Macready Orientation Core Service, 3678 Main St., Los Angeles, Calif.....	19
Madden, Lloyd Willis, c/o Blanche Kirkpatrick, Box 326, Bucklin, Kan.....	41

Maddox, Gerald C., Carter Oil Co., 514 Orpheum Bldg., Wichita, Kan.	29
Madera, Fred, The Ohio Oil Co., Box 1607, Hobbs, N. Mex.	42
Madera, Ruford Francisco, Shell Oil Co., Inc., Box 2099, Houston, Tex.	39
Maebius, Jed B., Gulf Refining Co., Box 811, Saginaw, Mich.	38
Magale, John F., Box 73, Shreveport, La.	38
Magalis, Cyrus West, Luling Oil & Gas Co., 2300 Alamo Natl. Bldg., San Antonio, Tex.	27
Maier, John C., Box 8315, University Sta., Baton Rouge, La.	36
Mahoney, John Francis, 709 Kirby St., Lake Charles, La.	36
Mahoney, Roger Sylvis, Strafford, Pa.	37
Major, Millard Holland, Dominican Seaboard Oil Co., Apt. 111, Ciudad Trujillo, Dominican Republic, C. A.	43
Malamphy, Mark C., U. S. Bureau of Mines, Box 1714, Little Rock, Ark.	30
Maley, Vaughn C., Humble Oil & Refining Co., Box 1600, Midland, Tex.	28
Maley, Willis A., Humble Oil & Refining Co., Box 1271, Corpus Christi, Tex.	29
Malkin, Doris S., Shell Oil Co., Inc., 641 M. & M. Bldg., Houston, Tex.	37
Mallory, Robert William, Stanolind Oil & Gas Co., Box 40, Casper, Wyo.	40
Manes, Oscar Bob, Stanolind Oil & Gas Co., Box 246, Gueydan, La.	38
Manger, G. Edward, Gulf Oil Corp., Box 2100, Houston, Tex.	37
Manion, Clarence E., c/o Manion Placer Mines, 1740 Grape St., Denver, Colo.	27
Mankin, Warren Ward, 2613 Lawrence Rd., Wichita Falls, Tex.	41
Manlove, Charles Francis, Union Oil Co. of California, Orcutt, Calif.	39
Mann, John F., Jr., Frontier Refining Co., Golden, Colo.	43
Mann, Robert Scott, Shell Oil Co., Inc., 2000 Alamo Natl. Bldg., San Antonio, Tex.	40
Manning, Lloyd R., Dept. of Revenue, Income Tax Div., Baton Rouge, La.	30
Manthos, Atlee G., 521 McLeary St., San Antonio, Tex.	38
Maples, Steve Campbell, Steve C. Maples & Co., 1348 S. Indianapolis, Tulsa, Okla.	41
Maravich, Milan D., 19 E. Fifteenth St., Tulsa, Okla.	42
Marble, Kennedy R., Carter Oil Co., Box 801, Tulsa, Okla.	43
Markham, Edmond O., Carter Oil Co., Box 801, Tulsa, Okla.	20
Markley, Elmer A., Barnsdall Oil Co., Tulsa, Okla.	23
Markley, Joseph H., Jr., The Texas Co., Box 1720, Fort Worth, Tex.	28
Marks, Jay Glenn, International Petroleum Co., Casilla 803, Guayaquil, Ecuador, S. A.	42
Marmaduke, Richard Calvin, Carter Oil Co., Box 1739, Shreveport, La.	42
Marr, John D., Seismic Explorations, Inc., Houston, Tex.	29
Marshall, Dan Landry, The Texas Co., Box 252, New Orleans, La.	44
Marshall, Frank Ellis, Snowden & McSweeney Co., 1106 Sinclair Bldg., Fort Worth, Tex.	36
Marshall, Jesse William, Box 1294, Pueblo, Colo.	42
Marshall, John, The Texas Co., Box 539, Ardmore, Okla.	38
Marshall, Lester R., Devonian Oil Co., 820 Ardis Bldg., Shreveport, La.	39
Marshall, Walter Hill, Union Producing Co., Box 1407, Shreveport, La.	40
Martin, B. G., Petroleum Administration for War, 247 Mellie Esperson Bldg., Houston, Tex.	30
Martin, Benjamin H., Sinclair Prairie Oil Co., Houston, Tex.	41
Martin, Bethea Allen, 1089 Cottonwood Ave., Beaumont, Tex.	41
Martin, Edgar E., Sun Oil Co., McAllen, Tex.	41
Martin, Francis I., Socony-Vacuum Oil Co. C. A., Apt. 246, Caracas, Venezuela, S. A.	23
Martin, Helen M., Dept. of Conservation, State Geological Survey, State Office Bldg., Lansing, Mich.	25
Martin, James Littell, Jr., Sinclair Prairie Oil Co., Tallahassee, Fla.	40
Martin, John Charles, Jr., Crown Central Petroleum Corp., Houston, Tex.	39
Martin, Lois T., Shell Oil Co., Inc., Bakersfield, Calif.	41
Martin, P. M., Continental Oil Co., Box 1800, Wichita Falls, Tex.	29
Martin, Robert Henry, The Texas Co., Box 299, Salem, Ill.	43
Martin, Rodolfo, Y.P.F., Avda. R. S. P. 777, Buenos Aires, Argentina, S. A.	42
Martin, Rudolf, Caribbean Petroleum Co., Caracas, Venezuela, S. A.	40
Martin, V. Dale, 326 N. Minnesota Ave., Columbus, Kan.	42
Martinez, Fidel Castilla, Cia Petrolera "My M," S. A., Apt. 347, Monterrey, N. L., Mexico	42
Martyn, Phillip F., J. S. Abercrombie, Co. 2105 Gulf Bldg., Houston, Tex.	28
Marvin, Gaurd Scott, Box 125, Salem, Ill.	37
Mason, John Frederick, Apt. 893, Caracas, Venezuela, S. A.	37
Mason, Shirley L., Stanolind Oil & Gas Co., Box 3092, Houston, Tex.	19
Masterson, Reba B., National Bank of Commerce Bldg., San Antonio, Tex.	23
Matheny, H. Claire, Sinclair Prairie Oil Co., Tyler, Tex.	27
Mather, Kirtley F., Harvard University, Cambridge, Mass.	21
Mathes, Donald E., Republic Producing Co., 1816 Petroleum Bldg., Houston, Tex.	23

Mathews, John W., Western Geophysical Co., Bakersfield, Calif.....	39
Mathias, Henry Edwin, Colorado College, Colorado Springs, Colo.....	42
Mathieu, Jean Leon, Schlumberger Well Surveying Corp., Houston, Tex.....	41
Matjasic, Wallace L., Honolulu Oil Corp., Bakersfield, Calif.....	40
Matson, Martin, Cities Service Oil Co., 907 Milam Bldg., San Antonio, Tex.....	25
Matson, Thomas Edwards, 1534 E. Seventeenth Pl., Tulsa, Okla.....	40
Matter, John Emerson, British-American Oil Producing Co., 530 W. Sixth St., Los Angeles, Calif.....	42
Matthews, Charles L., 817 N. A St., Wellington, Kan.....	38
Matthews, Edwin Patterson, 817 N. A St., Wellington, Kan.....	40
Maucini, Joseph J., Superior Oil Co., Wichita Falls, Tex.....	27
Mauck, Melvin Dwight, Rt. 3, Princeton, Ind.....	39
Maverick, Phillip, Securities & Exchange Commission, 103 U. S. Courthouse, Fort Worth, Tex.....	23
Maxson, John H., 650 Subway Terminal Bldg., Los Angeles, Calif.....	34
Maxwell, John Crawford, 2180 Foch St., Beaumont, Tex.....	39
Maxwell, Riley G., consulting, 418 Mims Bldg., Abilene, Tex.....	30
Maxwell, Ross Allen, National Park Service, Region III Headquarters, Santa Fe, N. Mex.....	30
May, Art R., Superior Oil Co., Bakersfield, Calif.....	21
May, George Nolan, Union Sulphur Co., Inc., Sulphur, La.....	37
May, John C., Associated Oil Co., Rt. 1, Box 197-X, Bakersfield, Calif.....	33
Mayer, Maurice Joseph, Jr., 1170 Park Blvd., Baton Rouge, La.....	42
Mayfield, Gid C., c/o Fikes & Mirchison, Dallas, Tex.....	38
Mayfield, William I., Petty Geophysical Engineering Co., Box 2601, San Antonio, Tex.....	41
Mayfield, William W., 705 Eighteenth St., N. W., Washington, D. C.....	38
Mayhew, Eldon Jay, Great Lakes Carbon Corp., Marion, Ky.....	41
McAdams, Ronald Earl, Shell Oil Co., Inc., 2000 Alamo Natl. Bldg., San Antonio, Tex.....	42
McAninch, Roy David, Stanolind Oil & Gas Co., Shawnee, Okla.....	42
McArthur, Donald, Texas Petroleum Co., Apt. 877, Bogota, Colombia, S. A.....	20
McAuliffe, Gilbert C., Southern Carbon Co., Drawer 1562, Monroe, La.....	32
McBee, William Dalton, Jr., Carter Oil Co., Oklahoma City, Okla.....	38
McCabe, William S., Stanolind Oil & Gas Co., Box 40, Casper, Wyo.....	38
McCall, Charles Louis, 924 Ratcliff St., Shreveport, La.....	43
McCall, John Edmond, Standard Oil Co. of California, Box 1528, Stockton, Calif.....	43
McCallum, Henry D., Humble Oil & Refining Co., Box 1271, Corpus Christi, Tex.....	31
McCammon, John Henry, Jr., c/o Bridwell Oil Co., Alice, Tex.....	39
McCampbell, John C., Dept. of Geology, Univ. of North Carolina, Chapel Hill, N. Car.....	36
McCampbell, William Gibson, Jr., Humble Oil & Refining Co., Miami, Fla.....	42
McCanne, Roland W., The Ohio Oil Co., Casper, Wyo.....	35
McCarter, W. Blair, consulting, 1415 Sul Ross, Houston, Tex.....	27
McCarver, Alfred Gerald, Plymouth Oil Co., Box 65, Midland, Tex.....	41
McCarver, Holland C., Seaboard Oil Co. of Delaware, Continental Bldg., Dallas, Tex.....	41
McCasland, Barney Clifton, Jr., Arkansas Fuel Oil Co., Shreveport, La.....	38
McClain, Forrest Milton, 1227 N. Grand, Enid, Okla.....	42
McClain, Orville Graves, Southern Minerals Corp., 411 N. Broadway, Corpus Christi, Tex.....	42
McClellan, Hugh W., Belridge Oil Co., McKittrick Calif.....	27
McCloskey, Downs, Amerada Petroleum Corp., 417 S. Hill St., Los Angeles, Calif.....	33
McCloy, Walter Lowrie, Jr., Standard Oil Co., 1766 Midland Bldg., Cleveland, Ohio.....	40
McCluer, R. D., c/o Paul Perez, Petroleos Mexicanos, Apt. 150, Tampico, Tamps., Mexico.....	22
McClure, Harold Yokum, Gulf Oil Corp., Box 1290, Fort Worth, Tex.....	38
McClure, Perry S., Rt. 1, Elizabethtown, Ky.....	36
McCobb, Harry W., c/o T. C. McCobb, 30 Rockefeller Plaza, New York, N. Y.....	28
McCollom, C. R., Fairchild's Aerial Surveys, Pasadena, Calif.....	23
McCollough, Edward H., Amerada Petroleum Corp., 417 S. Hill St., Los Angeles, Calif.....	24
McCollum, Leonard F., Standard Oil Co., Rm. 2770, 30 Rockefeller Plaza, New York, N. Y.....	27
McConnell, Robert B., Carter Oil Co., General Delivery, Cut Bank, Mont.....	43
McCormick, Robert Louis, Petroleum Research, Mineral Industries Bldg., State College, Pa.....	42
McCourt, James H., Glacier Production Co., Cut Bank, Mont.....	33
McCoy, Alex W., Deep Rock Oil Corp., Atlas Life Bldg., Tulsa, Okla.....	17
McCoy, Alexander Watts, III, Carter Oil Co., Box 2104, Billings, Mont.....	41
McCoy, George Young, 19 Crystal Lake Rd., Palestine, Tex.....	37
McCoy, James Roy, Phillips Petroleum Co., Staley Bldg., Wichita Falls, Tex.....	42
McCoy, Joseph Hanford, Sinclair Prairie Oil Co., Tulsa, Okla.....	37
McCrary, E. W., consulting, Box 861, Tulsa, Okla.....	18
McCready, Harry Joseph, Jr., 4923 Knox Ct., Denver, Colo.....	38
McCulloch, James Cole, Carter Oil Co., Box 801, Tulsa, Okla.....	40
McCulloch, Joseph P., The Texas Co., 135 E. Forty-second St., New York, N. Y.....	26

McCullough, A. Stafford, consulting, Clifton, Greene County, Ohio.....	17
McCullough, Edward Allen, Phillips Petroleum Co., Box 791, Midland, Tex.....	41
McCullough, Russell L., Cities Service Oil Co., Box 306, Great Bend, Kan.....	25
McCune, Paul, c/o McCune & Michaels, Burk Burnett Bldg., Fort Worth, Tex.....	28
McDaniel, Fred, Cities Service Oil Co., Box 751, Great Bend, Kan.....	39
McDermott, Eugene, Geophysical Service, Inc., 1311 Republic Natl. Bank Bldg., Dallas, Tex.....	29
McDonald, Worth W., 2154 W. Kings Highway, San Antonio, Tex.....	24
McDonnold, Haydon W., The Texas Co., Box 2332, Houston, Tex.....	36
McDowell, Alfred Norman, 3001 Wood St., Texarkana, Tex.....	43
McEachin, Wright Daniel, Sinclair Prairie Oil Co., Box 521, Tulsa, Okla.....	38
McFadden, William A., Jr., Standard Oil Co. of Texas, Box 1249, Houston, Tex.....	38
McFarlan, Arthur Crane, Univ. of Kentucky, Lexington, Ky.....	38
McFarland, Earl R., Coralena Oil Co., 929 Kennedy Bldg., Tulsa, Okla.....	30
McFarland, L. R., Magnolia Petroleum Co., Box 1406, Shreveport, La.....	33
McFarland, Paul W., Sun Oil Co., Box 2880, Dallas, Tex.....	23
McFarland, Russell S., Seaboard Oil Co., 1400 Continental Bldg., Dallas, Tex.....	18
McFeron, George I., Adams Oil & Gas Co., 840 Mellie Esperson Bldg., Houston, Tex.....	22
McGaha, Charles P., Fain-McGaha Oil Corp., 607 Hamilton Bldg., Wichita Falls, Tex.....	29
McGee, D. A., Kerlyn Oil Co., 2009 First Natl. Bank Bldg., Oklahoma City, Okla.....	29
McGee, John Evan, Gulf Research & Development Co., Drawer 2038, Pittsburgh, Pa.....	43
McGehee, J. Rex, Shell Oil Co., Inc., Box 1191, Tulsa, Okla.....	30
McGhee, George C., 6305 Malvey, Fort Worth, Tex.....	31
McGill, William M., State Geological Survey, Box 1428, University Sta., Charlottesville, Va.....	26
McGill, James N., Tide Water Associated Oil Co., Thompson Bldg., Tulsa, Okla.....	25
McGlothlin, Tom, Gulf Refining Co., Box 1105, Jackson, Miss.....	29
McGovney, Paul E., Honolulu Oil Corp., 215 Market St., San Francisco, Calif.....	39
McGowan, F. H., Humble Oil & Refining Co., Humble Bldg., Houston, Tex.....	29
McGrew, Harry Johnson, Gulf Research & Development Co., Box 2038, Pittsburgh, Pa.....	43
McGuigan, Francis Henry, Lion Oil Refining Co., Butler Bldg., Midland, Tex.....	38
McGuirt, James H., Magnolia Petroleum Co., Box 780, Tyler, Tex.....	36
McHugh, James W., The Texas Co., Mattoon, Ill.....	40
McHugh, William Ernest, Phillips Petroleum Co., 610 Petroleum Bldg., Wichita, Kan.....	35
McIntyre, George Tayloe, Box 4577, Capitol Hill Sta., Oklahoma City, Okla.....	30
McIntyre, Paul J., consulting, 703 Natl. Bank of Commerce Bldg., Tulsa, Okla.....	19
McKay, Alexander Ewing, 1809 W. Broadway, Enid, Okla.....	30
McKee, Edwin D., Museum of Northern Arizona, Flagstaff, Ariz.....	41
McKee, H. Harper, c/o Brokaw, Dixon & McKee, 120 Broadway, New York, N. Y.....	17
McKinlay, Ralph Harold, Magnolia Petroleum Co., Wichita Falls, Tex.....	44
McKinnon, Frederick Allan, Imperial Oil, Ltd., 10831 Eighty-fourth Ave., Edmonton, Alta., Canada.....	43
McKinsey, Mark Howard, Shell Oil Co., Inc., Box 1509, Midland, Tex.....	40
McKnight, C. R., 3518 Gunston Rd., Alexandria, Va.....	25
McLaren, Robert L., Arkansas Louisiana Gas Co., Shreveport, La.....	27
McLaughlin, Thad G., U. S. Geological Survey, Lawrence, Kan.....	43
McLellan, Hiram J., Humble Oil & Refining Co., Box 2180, Houston, Tex.....	20
McLendon, Dan Harvey, c/o Mrs. Dan H. McLendon, Rayne, La.....	41
McLeod, Angus, consulting, Apt. 412, Maple Terrace, Dallas, Tex.....	19
McMahon, Joe Trees, Benedum-Trees Oil Co., 311 First Natl. Bank Bldg., Shreveport, La.....	43
McMasters, John Herbert, Honolulu Oil Corp., 410 Professional Bldg., Bakersfield, Calif.....	42
McMillan, John Robertson, Fullerton Oil Co., 510 S. Spring St., Los Angeles, Calif.....	38
McMillan, Robert, Frontier Refining Co., 628 First Natl. Bank Bldg., Denver, Colo.....	42
McMillan, Joseph M., Jr., Adams Oil & Gas Co., Box 515, Yorktown, Tex.....	27
McMillen, Raymond F., Coralena Oil Co., 929 Kennedy Bldg., Tulsa, Okla.....	27
McMorris, William Albert, Jr., 1640 N. Cincinnati Ave., Tulsa, Okla.....	41
McMurtry, Wilbur Earl, Box 1036, Wichita, Kan.....	41
McNab, James, 363 Italia St., Covina, Calif.....	37
McNally, Perry Michael, Phillips Petroleum Co., Box 547, Plaquemine, La.....	43
McNaughton, Duncan Anderson, Box 1300, Kelowna, B. C., Canada.....	41
McNeal, Robert Paul, Shell Oil Co., Inc., 328 E. Broadway, Centralia, Ill.....	41
McNeely, Robert B., consulting, 209 Petroleum Bldg., Wichita, Kan.....	25
McNeil, Harold E., Great Lakes Carbon Corp., 501 Petroleum Bldg., Wichita, Kan.....	39
McNutt, Gordon Russell, 915 W. Twenty-third, Austin, Tex.....	42
McQueen, Henry S., The Republic Mining & Manufacturing Co., Rm. 2535, 230 Park Ave., New York, N. Y.....	33
McReynolds, Gregg F., Box 99, Palestine, Tex.....	36

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Mead, Roy G., Jr., 307 N. Allessandro St., Temple City, Calif.	39
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Mehl, M. G., Dept. of Geology, Univ. of Missouri, Columbia, Mo.	17
Meholin, Graydon L., Sinclair Prairie Oil Co., Tyler, Tex.	42
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Mellen, William P., The California Co., Denver, Colo.	31
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Melville, Albert George, consulting, Manhattan Beach, Calif.	38
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Melvin, Marlowe D., Carter Oil Co., Box 801, Tulsa, Okla.	39
Melzer, Laurence S., Stanolind Oil & Gas Co., Box 2080, Amarillo, Tex.	41
Mendelsohn, Clive A., Anglo-Portuguese Oil Co., Ltd., Lisbon, Portugal.	31
*Mendenhall, Walter C., 9 E. Lenox St., Chevy Chase, Md.	22
Menefee, James C., Magnolia Petroleum Co., Box 900, Dallas, Tex.	36
Menger, Hubert Emil, Stanolind Oil & Gas Co., 1132 Milam Bldg., San Antonio, Tex.	36
Menken, Fred A., Associated Oil Co., 225 Bush St., San Francisco, Calif.	32
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Merritt, Floyd C., Byron Jackson Co., Vernon, Calif.	23
Merritt, John W., consulting, 213-14 Midco Bldg., Tulsa, Okla.	18
Merritt, Roy W., American Embassy, Bogota, Colombia, S. A.	29
Merry, Edward T., Merry Bros. & Perini, Inc., Abilene, Tex.	25
Mershon, Milton M., Fort Smith Gas Co., Tulsa, Okla.	25
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Metcalf, Myron C., Carter Oil Co., 514 Orpheum Bldg., Wichita, Kan.	30
Mettner, Francis Edwin, Transwestern Oil Co., 605 Union Natl. Bank Bldg., Wichita, Kan.	38
Metts, Dean Francis, Humble Oil & Refining Co., 1405 Canal Bldg., New Orleans, La.	34
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Meyer, Ruskin H., c/o E. A. Meyer, Rt. 2, Anthony, Kan.	42
Meyer, Willis G., DeGolyer, MacNaughton & McGhee, 1000 Continental Bldg., Dallas, Tex.	37
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Miller, John Bode, Richmond Petroleum Co. of Colombia, Apt. 2760, Bogota, Colombia, S. A.	41
Miller, John C., The Texas Co., Box 2332, Houston, Tex.	28

## MEMBERS

389

Miller, John Robson, U. S. Geological Survey, Washington, D. C.....	42
Miller, Lloyd E., c/o Mrs. A. Miller, 4715 Pillsbury Ave. S., Minneapolis, Minn.....	41
Miller, Milward, Humble Oil & Refining Co., Midland, Tex.....	33
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Miller, Robert P., Richmond Petroleum Co. of Colombia, Apt. 2760, Bogota, Colombia, S. A.....	28
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Mills, Coe S., Box 1168, Tampa, Fla.....	27
Mills, Lloyd Clarence, Pure Oil Co., Box 671, Midland, Tex.....	39
Mills, R. van A., Continental Oil Co., Ponca City, Okla.....	21
Mills, Ruben C., Jr., Standard Oil Co. of Texas, Midland, Tex.....	42
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Milton, William Billingslea, Jr., Gulf Oil Corp., Box 2100, Houston, Tex.....	38
Ming, Raymond E., Stanolind Oil & Gas Co., Box 3092, Houston, Tex.....	42
Minor, H. E., Gulf Oil Corp., Houston, Tex.....	18
Minton, Joseph Weber, Sun Oil Co., McAllen, Tex.....	36
Minton, Robert Joseph, North LaBarge Oil Co., Box 46, LaBarge, Wyo.....	41
Miser, Hugh D., U. S. Geological Survey, Washington, D. C.....	23
Mitchell, George D., Jr., The Texas Co., Box 2332, Houston, Tex.....	34
Mitchell, Harold D., Housing Authority, Seattle, Washington.....	38
Mitchell, James G., Pure Oil Co., Box 311, Olney, Ill.....	41
Mitchell, Mark William, Rt. 4, Box 67, Baton Rouge, La.....	41
Mitchell, Robert B., Foran, Boatright & Dixon, 1906 Second Natl. Bank Bldg., Houston, Tex.....	29
Mitchell, Robert Oliphant, Stanolind Oil & Gas Co., Box 40, Casper, Wyo.....	42
Mix, Adrian Elroy, Socony-Vacuum Oil Co., Apt. 246, Caracas, Venezuela, S. A.....	42
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Mohler, Charles Edwin, 402 S. Sixth St., Rogers, Ark.....	39
Mohler, Donald Phillips, Humble Oil & Refining Co., Amarillo, Tex.....	39
Mohr, C. L., 4222 Birchman Ave., Fort Worth, Tex.....	25
Moir, John, c/o J. C. Jackson, Eagle, Chambers County, Tex.....	26
Monaghan, Richard Joseph, c/o S.A.P. Las Mercedes, Apt. 1429, Caracas, Venezuela, S. A.....	43
Monahan, Charles Joseph, A.P.O. 860, c/o Postmaster, New York, N. Y.....	40
Monahan, Foster Murray, 704 N. Evanston, Tulsa, Okla.....	42
Moncrief, E. C., c/o Lauck & Moncrief, 520 Fourth Natl. Bank Bldg., Wichita, Kan.....	23
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Monsour, Emil, Sun Oil Co., Box 2880, Dallas, Tex.....	36
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Montgomery, Don D., 3072 S. Abingdon, Arlington, Va.....	38
Montgomery, James Campbell, Harrison Oil Co., Gulf Bldg., Houston, Tex.....	37
Montgomery, James G., Jr., United Natural Gas Co., 308 Seneca St., Oil City, Pa.....	26
Montgomery, Phil C., Halliburton Oil Well Cementing Co., Duncan, Okla.....	31
Moody, Clarence L., The Ohio Oil Co., Ricou-Brewster Bldg., Shreveport, La.....	20
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Moody, Ray R., Gulf Oil Corp., 1107 Union Natl. Bank Bldg., Wichita, Kan.....	27
Moore, Barton W., 2005 S. Robertson, Tyler, Tex.....	31
Moore, Bernard Nettleton, c/o Consolidada de Petroleo, Maturin, Monagas, Venezuela, S. A.....	41
Moore, Carl Alphin, Carter Oil Co., Box 1151, Seminole, Okla.....	39
Moore, David A., Superior Oil Co., 313 Sill Bldg., Bakersfield, Calif.....	43
Moore, Fred Holmsley, Magnolia Petroleum Co., Box 535, Mt. Vernon, Ill.....	37
Moore, Gilbert Parvin, Auto Ordnance Corp., 904 Continental Bldg., Dallas, Tex.....	24
Moore, Homer Clarence, Mid-Continent Petroleum Corp., Box 381 Tulsa, Okla.....	40
Moore, Horatio L., J. E. Crosbie, Inc., 1810 Natl. Bank of Tulsa, Bldg., Tulsa, Okla.....	42
Moore, James A., Union Sulphur Co., Sulphur, La.....	42

Moore, Joe Hiram, Fullerton Oil Co., Box H, Hobbs, N. Mex.	42
Moore, Joe Laurence, Honolulu Oil Corp., Drawer 1391, Midland, Tex.	43
Moore, John I., independent, Box 753, Midland, Tex.	26
Moore, Kenneth B., 939 Twenty-fifth St., Santa Monica, Calif.	29
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Moreman, Walter L., Magnolia Petroleum Co., Box 1828, Oklahoma City, Okla.	30
Moreno, Joseph E., Skelly Oil Co., Box 1650, Tulsa, Okla.	23
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Morgan, Cecil L., 351 Edwards Hotel, Jackson, Miss.	29
Morgan, Charles Gill, Apt. 196, Arlington Village, Arlington, Va.	31
Morgan, D. E., Shell (Queensland) Development, Ltd., Box 1456 T, Brisbane, Queensland, Australia.	28
Morgan, D. M., c/o L. H. Wentz, Box 111, Ponca City, Okla.	25
Morgan, Frank A., Richfield Oil Corp., 555 S. Flower, Los Angeles, Calif.	24
Morgan, George D., Cardinal Oil Co., Box 1030, San Angelo, Tex.	22
Morgan, Henry J., Jr., The Atlantic Refining Co., Box 2819, Dallas, Tex.	28
Morgan, John Man, Union Producing Co., Box 2492, Houston, Tex.	44
Morgan, L. C., Morgan Acid, Inc., 505 Petroleum Bldg., Wichita, Kan.	30
Morgan, Lindsey G., Cities Service Oil Co., Mattoon, Ill.	30
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Morgan, Robert Edward, The Atlantic Refining Co., 1742 Milam Bldg., San Antonio, Tex.	39
Morley, Harold T., Stanolind Oil & Gas Co., Box 591, Tulsa, Okla.	19
Morrill, Junius Houghes, Carter Oil Co., Canton, Miss.	42
Morris, A. Ferd, Cities Service Oil Co., 1440 Esperson Bldg., Houston, Tex.	21
Morris, James L., Pure Oil Co., Box 2107, Fort Worth, Tex.	39
Morris, Lawrence Kendall, United Geophysical Co., Casilla 600, Punta Arenas, Magallanes, Chile, S. A.	39
Morris, Louis H., The Texas Co., Box 2332, Houston, Tex.	38
Morris, Walter W., Eagle-Picher Mining & Smelting Co., Henryetta, Okla.	24
Morrison, T. E., Humble Oil & Refining Co., Box 2180, Houston, Tex.	27
Morrow, A. Lyndon, Magnolia Petroleum Co., Box 872, Lake Charles, La.	37
Morse, Roy R., Shell Oil Co., Inc., Shell Bldg., Houston, Tex.	24
Morse, William C., Dept. of Geology, Univ. of Mississippi, University, Miss.	21
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Morton, Robert Brading, Tide Water Associated Oil Co., 418 Court Bldg., Evansville, Ind.	43
Mosburg, Lewis G., Stanolind Oil & Gas Co., Stanolind Bldg., Tulsa, Okla.	26
Moses, Carl Edward, Phillips Petroleum Co., Quincy, Fla.	38
Moses, Harold F., Carter Oil Co., Box 801, Tulsa, Okla.	29
Mosher, William Nelson, Standard Oil Co. of Texas, Houston, Tex.	43
Moss, Frank A., 28 Ridge St., South Perth, W. Australia.	29
Moss, Rycroft G., Phillips Petroleum Co., Bartlesville, Okla.	34
Mossman, Reuel Wallace, Seismograph Service Corp., 709 Kennedy Bldg., Tulsa, Okla.	36
Mossom, Stuart, Magnolia Petroleum Co., 1704 Alamo Natl. Bldg., San Antonio, Tex.	29
Mott, William Dick, c/o R. J. Mott, Ashton Prairie, N. Queensland, Australia.	39
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Muilenburg, Garrett A., Missouri School of Mines, Rolla, Mo.	41

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Mulholland, Malcolm M., Tropical Oil Co., Barranca-Bermeja, Colombia, S. A.	40
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Mullerried, F. K. G., Av. Mazatlan 208, Tacubaya, D. F., Mexico	24
Mullinax, Jack D., Rt. 3, Chesnee, S. C.	38
Mundorf, T. Dean, Gulf Refining Co., Box 106, Indianapolis, Ind.	37
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Munroe, Donald J., Sun Oil Co., Box 186, Tallahassee, Fla.	28
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Musselman, George Abraham, Carter Oil Co., Drawer 1490, Jackson, Miss.	39
Myers, Clay Kenton, c/o John G. Myers Co., Albany, N. Y.	37
Myers, Desaix B., Union Oil Co. of California, Union Oil Bldg., Los Angeles, Calif.	25
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Myers, LeMoyné Ward, Creole Petroleum Co., Caripito, Venezuela, S. A.	38
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Nauss, Arthur William, International Petroleum Co., Talara, Peru, S. A.	42
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Neely, Joseph, Lovell, Wyo.	36
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Newell, Norman D., c/o Ingenieros de Minas, Lima, Peru, S. A.	39

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Nye, S. Spencer, U. S. Geological Survey, Washington, D. C.	27
Nygren, Walter Eric, California-Ecuador Petroleum Co., Palacio Comercio 312, Quito, Ecuador S. A.	43
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O'Boyle, Charles C., Anchor Exploration Co., Golden, Colo.	43
O'Brien, Jerome J., consulting, 714 W. Olympic Blvd., Los Angeles, Calif.	38
O'Brien, Joseph Alfred, 2910 Jackson, Sioux City, Iowa.	42
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Ogier, E. H., Lloyd Corp., Ltd., Los Angeles, Calif.	31
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Oldham, Albert E., Aloco Oil Co., Dallas, Tex.	25
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Rincones, Carlos Vogeler, Mene Grande Oil Co., Apt. 45, Barcelona, Venezuela, S. A.	42
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Roberts, Gerald C., Sinclair Prairie Oil Co., Midland, Tex.	38
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Roberts, Richard Lee, Vickers Petroleum Co., Wichita, Kan.	41
Roberts, Thomas N., British American Oil Producing Co., 805 Petroleum Bldg., Wichita, Kan.	35
Robertson, George Kenneth, Pure Oil Co., Hollister, Calif.	38
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## MEMBERS

401

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Shelton, John Sewall, U. S. Geological Survey, Claremont, Calif.	42

Shepard, Francis Parker, Univ. of California, Division of War Research, U. S. Navy Radio & Sound Laboratory, San Diego, Calif.....	37
Shepherd, George Frederick, c/o William Helis, New Orleans, La.....	38
Sheppard, Charles Wilcox, Massachusetts Inst. of Technology, Cambridge, Mass.....	44
Sherar, Edgar Smith, Tide Water Associated Oil Co., Box 1404, Houston, Tex.....	34
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Shoemaker, William Morris, Forest Oil Corp., Bradford, Pa.....	43
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Short, Richard T., Navarro Oil Co., Alice, Tex.....	35
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Simian G., Eduardo, Corporacion de Fomento de la Produccion, Punta Arenas, Chile, S. A.....	43
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Simons, James A., Carter Oil Co., Jackson, Miss.....	44
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Touwaide, Marcel E., Comité Natl. du Kivu, Costermansville, Belgian Congo.	29
Tovell, Walter Massey, Standard Oil Co. of British Columbia, Lancaster Bldg., Calgary, Alta., Canada.	42
Townley, Enid, State Geological Survey, Urbana, Ill.	33
Townsend, Rex M. F., Office of the Petroleum Adviser, Rm. 363, Department of State, Washington, D. C.	27
Trager, Earl A., Bureau of Mines, Washington, D. C.	18
Trager, Hugh Harold, The Atlantic Refining Co., 910 Central Bldg., Wichita, Kan.	37
Trask, Parker D., U. S. Geological Survey, Washington, D. C.	26
Traupe, Lloyd Desmond, The Ohio Oil Co., Box 253, Lafayette, La.	41
Travers, William J., Jr., Richfield Oil Corp., Box LL, Taft, Calif.	36
Travis, Abe, 110 Midco Bldg., Tulsa, Okla.	30
Travis, Joe Johnson, Barnsdall Oil Co., 904 Driscoll Bldg., Corpus Christi, Tex.	39
Travis, Russell Burton, Forestville, Calif.	43
Treadwell, Mary Louise, 912 Philtower Bldg., Tulsa, Okla.	44
Trenchard, John, Whisenant & Trenchard, San Antonio, Tex.	30
Triplett, Richard L., Contract Core Drilling, 2013 Westview St., Los Angeles, Calif.	28
Tripp, Russell Maurice, Colorado School of Mines, Golden, Colo.	39
Trombla, Lynn Burdeaux, Superior Oil Co., Box 96, Bakersfield, Calif.	41
Trowbridge, Arthur C., Univ. of Iowa, Iowa City, Iowa.	22
Trowbridge, Raymond M., consulting, 225 Owen Bldg., Tyler, Tex.	36
Troxell, John N., The Texas Co., Box 2332, Houston, Tex.	25
Truex, Arthur F., Sun Oil Co., Box 1348, Tulsa, Okla.	19
Trumpy, Daniel, Cia Shell, Apt. 114, Bogota, Colombia, S. A.	25
Tschopp, Herman I., Shell Oil Co. of Ecuador, Inc., Apt. 340, Quito, Ecuador, S. A.	27
Tuck, Louis Lester, 2201 Broadway, Mt. Vernon, Ill.	41
Tucker, Paul M., c/o H. T. Abercrombie, Barnard, Kan.	37
Tucker, Reese Herrick, Cities Service Oil Co., 1440 Mellie Esperson Bldg., Houston, Tex.	37
Tucker, Reagan, 521 Naples St., Corpus Christi, Tex.	36
Tucker, Rietz C., Box 265, Morgantown, W. Va.	21
Tucker, Robert Louis, Magnolia Petroleum Co., Box 900, Dallas, Tex.	42
Tullis, Edward L., South Dakota State School of Mines, Rapid City, S. Dak.	38
Tuohy, John D., Standard Oil Co. of Venezuela, Caripito, Venezuela, S. A.	40
Turman, Arthur F., Standard Oil Co. of California, Bin XX, Taft, Calif.	23
Turnbull, Wade William, Carter Oil Co., Box 72, Carmi, Ill.	40
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Turner, Dale Edward, Superior Oil Co., Box 899, Madera, Calif.	43
Turner, Francis Earl, Dept. of Geology, Texas A. & M. College, College Station, Tex.	37
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Tuttle, Helen Fowler, Union Oil Co., Los Angeles, Calif.	41
Tuttle, Richard Carol, Sunray Oil Co., Philtower Bldg., Tulsa, Okla.	42
Twenhofel, W. H., Science Hall, Univ. of Wisconsin, Madison, Wis.	20
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Tyler, Henry Johnson, The Atlantic Refining Co., Rome, N. Y.	39
Tyson, Alfred K., Continental Oil Co., Oil & Gas Bldg., Houston, Tex.	24
Uhlig, Leonard F., c/o Mrs. Nell C. Uhlig, c/o E. T. Chapman, Lolita, Tex.	37
Umbach, Paul Henry, Stanolind Oil & Gas Co., Box 337, Cortez, Colo.	39

## MEMBERS

409

Umpleby, Joseph B., consulting, 4544 Fifty-fifth Ave., N. E., Seattle, Wash.....	19
Upp, Jerry E., Amerada Petroleum Corp., Box 2040, Tulsa, Okla.....	29
Upson, M. E., Gulf Oil Corp., Box 1200, Fort Worth, Tex.....	29
Urbom, Oscar William, 3737 Sunset Blvd., Houston, Tex.....	39
Uren, Lester C., Hearst Mining Bldg., Univ. of California, Berkeley, Calif.....	26
Uri, Joseph John, 512 N. Okmulgee, Okmulgee, Okla.....	39
Ustynik, Edwin Frank, Box 90, Rosenberg, Tex.....	38
Utterback, Claude, Phillips Petroleum Co., Petroleum Bldg., Wichita, Kan.....	41
Uwatoko, Kunio, Dept. of Mining, Tokyo Imperial University, Tokyo, Japan.....	29
Valentine, William W., Fullerton Oil Co., 1020 Security Bldg., Los Angeles, Calif.....	30
Valerius, Claude N., Barnsdall Oil Co., 817 Texarkana Natl. Bank Bldg., Texarkana, Tex.....	25
Valerius, M. M., Jay, Okla.....	18
Vallat, Eugene H., The Ohio Oil Co., 437 S. Hill St., Los Angeles, Calif.....	31
Van Aken, Harrison Halleck, Permian Oil Corp., 607 Lubbock Natl. Bldg., Lubbock, Tex.....	43
Van Amringe, Edwin Verne, Pasadena Junior College, Pasadena, Calif.....	41
Van Beveren, O. F., A.P.O. 787, c/o Postmaster, New York, N. Y.....	35
Van Burgh, Lisle K., Bureau of Internal Revenue, 1316 Houston Cotton Exchange Bldg., Houston, Tex.....	21
Vance, Harold, Texas A. & M. College, College Station, Tex.....	31
Vance, Warner R., Gulf Research & Development Co., Box 2038, Pittsburgh, Pa.....	27
Van Couvering, Martin, 1734 Hillside Dr., Glendale, Calif.....	24
Van Dall, John E., Magnolia Petroleum Co., Box 1828, Oklahoma City, Okla.....	22
Vandenberg, Frederick Ellsworth, c/o Mrs. R. W. Heffelfinger, 2318 W. Eighth St., Los Angeles, Calif.....	38
Vander Leck, Lawrence, Box 117, Altadena, Calif.....	26
van der Linden, B. H., Asiatic Petroleum Corp., 8th Floor, 50 W. Fiftieth St., New York, N. Y.....	19
Vanderpool, Eugene Ward, Stanolind Oil & Gas Co., Box 1540, Midland, Tex.....	39
Vanderpool, Harold C., Seaboard Oil Co., Continental Bldg., Dallas, Tex.....	26
Vandiver, Vincent W., Seaboard Oil Co., 417 S. Hill St., Los Angeles, Calif.....	20
Van Eaton, Raymond Andrew, Mills Bennett Producing Co., 3402 Gulf Bldg., Houston, Tex.....	40
Van Gilder, H. R., Sohio Oil Co., Atlas Bldg., Shreveport, La.....	24
Van Gogh, F. A. A., Zeekant 108 Schev., The Hague, Netherlands.....	21
Van Melle, Francois Anthoine, Shell Oil Co., Inc., Houston, Tex.....	36
Van Orstrand, C. E., U. S. Geological Survey, Washington, D. C.....	31
Van Sant, John Sigmund, c/o J. M. Huber Corp., Box 831, Borger, Tex.....	39
Van Steenbergh, Samuel Kermit, Sinclair Prairie Oil & Gas Co., 1507 Fair Bldg., Fort Worth, Tex.....	34
Van Tine, Arthur Benbrook, Gulf Oil Corp., Drawer 110, Amarillo, Tex.....	41
Van Tuyl, Francis M., Colorado School of Mines, Golden, Colo.....	22
van Weelden, A., c/o L. K. Mower, Shell Oil Co., Inc., Box 2099, Houston, Tex.....	25
Van Zant, James H., Eason Oil Co., 1011 Fort Worth Natl. Bank Bldg., Fort Worth, Tex.....	24
Vaudoit, Paul L., Fifteen Oil Co., 611 West Bldg., Houston, Tex.....	26
Vaughan, T. Wayland, 427 National Museum, Washington, D. C.....	26
Vaughn, Grady Henry, Jr., G. H. Vaughn Drilling & Production Co., Box 30, Magnolia, Ark.....	41
Vazquez, Andres Lopez, Petroleos Mexicanos, Villagran 133 Norte, Monterrey, N. L., Mexico.....	41
Vedder, Dwight G., independent, Rm. 601, 811 W. Seventh St., Los Angeles, Calif.....	29
Veeder, John A., Amerada Petroleum Corp., Box 591, Midland, Tex.....	38
Vercesi, Daniel Rey, 2563 Ave. Gral. San Martin, Montevideo, Uruguay, S. A.....	37
Verckler, Stewart P., Box 532, Abilene, Kan.....	42
Vernon, Benton R., Mid-Continent Petroleum Corp., Box 404, Shreveport, La.....	38
Vernon, I. J., Coweta, Okla.....	25
Vernon, Jess, Amerada Petroleum Corp., Box 2040, Tulsa, Okla.....	25
Vertrees, Charles D., Continental Oil Co., Box 431, Midland, Tex.....	24
Ver Wiebe, Walter A., Dept. of Geology, Univ. of Wichita, Wichita, Kan.....	19
Vesely, Leon R., 1711 Fifth Ave., S. E., Cedar Rapids, Iowa.....	38
Vetter, John M., Pan-American Producing Co., 1245 Mellie Esperson Bldg., Houston, Tex.....	24
Vickery, Ward R., Vernon Oil & Gas Co., 214 Fourth Natl. Bank Bldg., Wichita, Kan.....	28
Vincent, Mordelo L., Jr., Box 868, Eunice, La.....	38
Vitt, Alfred W., Seaboard Oil Co. of Delaware, 417 S. Hill St., Los Angeles, Calif.....	37
Voigt, Harold E., Superior Oil Co., Oil & Gas Bldg., Houston, Tex.....	36
Volk, Russell H., Plains Exploration Co., Denver, Colo.....	42
Vonderschmitt, Louis, Geol.-Paleon. Institut, Bernoullianum, Basel, Switzerland.....	39
von Estorff, Fritz E., Socony-Vacuum Oil Co., Inc., Rm. 1700, 26 Broadway, New York, N. Y.....	30
Von Osinski, William, Klaus Exploration Co., Box 1617, Lubbock, Tex.....	39

Vorbe, Georges, Dept. of Geology, New Mexico School of Mines, Socorro, N. Mex.....	26
Waddell, Richard Kent, Boeing Airplane Co., Wichita, Kan.....	41
Wade, Arthur, Shell Oil Co., Inc., Shell House, Ann St., Brisbane, Queensland, Australia.....	27
Wade, Rolla Theodore, Schlumberger Well Surveying Corp., Box 71, Winnfield, La.....	36
Wade, Wallace Lee, c/o Mrs. Minnie P. Wade, Rice Hotel, Houston, Tex.....	41
Wadell, Hakon A., consulting, 6720 S. Jeffrey Ave., Chicago, Ill.....	27
Wadsack, George E., Jr., 1517 Oklahoma Ave., Norman, Okla.....	40
Wadsworth, Albert Hodges, Jr., U. S. Geological Survey, Bay City, Tex.....	41
Wadsworth, F. Lowry, 317 Ninth St., Bakersfield, Calif.....	37
Waering, Erik Norman, Depto. de Exploracion, Petroleos Mexicanos, Av. Juarez #95, Mexico, D. F., Mexico.....	44
Wagener, Charles H., independent, 842 Milam Bldg., San Antonio, Tex.....	20
Waggoner, Eugene B., Superior Oil Co., 506 First Natl. Bank Bldg., Denver, Colo.....	43
Waggoner, Stephen Gose, 1600 Buchanan St., Wichita Falls, Tex.....	29
Wagner, Carl D., consulting, 2259 S. Troost, Tulsa, Okla.....	39
Wagner, Carroll M., General Petroleum Corp., 1003 Higgins Bldg., Los Angeles, Calif.....	20
Wagner, Cary Richard, Jr., Pure Oil Co., Box 2127, Amarillo, Tex.....	40
Wagner, Clyde L., consulting, 2259 S. Troost, Tulsa, Okla.....	27
Wagner, J. Basil, consulting, Box 37, Chandler, Okla.....	27
Wagoner, George E., Carter Oil Co., Box 801, Tulsa, Okla.....	28
Wahlstrom, Edwin A., 1700 W. Holloway, Midland, Tex.....	27
Wails, Elmer D., Midstates Oil Corp., 518 Natl. Bank of Tulsa Bldg., Tulsa, Okla.....	31
Waite, Stephen Temple, U.B.O.T., Point Fortin, Trinidad, B. W. I.....	41
Walcher, Wayne E., Lario Oil & Gas Co., Mt. Vernon, Ill.....	40
Waldschmidt, W. A., Box 1888, Midland, Tex.....	26
Walker, Edward Bullock, III, 11080685, Class 98, A.A.-O.C.S., Camp Davis, N. Car.....	43
Walker, James Edward, Shell Oil Co., Inc., Box 2099, Houston, Tex.....	44
Walker, Jule Hargis, The Ohio Oil Co., 1417 Milam Bldg., San Antonio, Tex.....	36
Walker, Lucian H., consulting, 2533 E. Eighteenth St., Tulsa, Okla.....	20
Walker, William Lester, 431 Belle Terrace, Bakersfield, Calif.....	18
Wall, Earle R., The California Co., 1818 Canal Bldg., New Orleans, La.....	29
Wall, Thomas E., consulting, 1015 1/2 Broadway, Mt. Vernon, Ill.....	30
Wallace, Davis M., consulting, 1207 Niels Esperson Bldg., Houston, Tex.....	27
Wallace, Louis Stacy, Superior Oil Co., Box 510, Midland, Tex.....	40
Wallace, P. A., Ray Stephens, Inc., 2600 Apco Tower, Oklahoma City, Okla.....	36
Wallace, William Edwin, Jr., 830 Wilkinson St., Shreveport, La.....	39
Wallis, William E., Standard Oil Co. of Cuba, Apt. 1303, Havana, Cuba.....	30
Walpole, Leonard Whitworth, Caribbean Petroleum Co., Maracaibo, Venezuela, S. A.....	41
Walter, Henry Glenn, The Ohio Oil Co., Findlay, Ohio.....	37
Walter, Karl L., 2695 Elm St., Denver, Colo.....	29
Walters, Mason G., Apt. C-445, 3012 Gainesville St., S. E., Washington, D. C.....	28
Walters, Ray P., Standard Oil Co. of New Jersey, Rm. 2150, 30 Rockefeller Plaza, New York, N. Y.....	20
Walters, Robert F., Gulf Oil Corp., Box 661, Tulsa, Okla.....	43
Waltman, W. D., 601 Edison Bldg., Fifth at Grand, Los Angeles, Calif.....	29
Walton, George Goodrich, Carter Oil Co., Drawer 1739, Shreveport, La.....	38
Walton, Oscar Edward, The Atlantic Refining Co., 8th Floor, Magnolia Bldg., Dallas, Tex.....	30
Walton, Paul Talmage, Pacific Western Oil Corp., 405 Consolidated Royalty Bldg., Casper, Wyo.....	43
Wanennmacher, Joseph M., Shell Oil Co., Inc., Box 1191, Tulsa, Okla.....	27
Wanless, Harold R., 126 Natural History Bldg., Univ. of Illinois, Urbana, Ill.....	32
Wantland, Dart, Colorado School of Mines, Golden, Colo.....	31
Ward, Dwight Edward, 1426 Cherry Ave., Long Beach, Calif.....	39
Ward, J. H. E., Forest Development Corp., 1229 Milam Bldg., San Antonio, Tex.....	39
Ward, Roderick C., Superior Oil Co., Evansville, Ind.....	35
Ward, Roland Van, 407 E. High St., Charlottesville, Va.....	41
Ware, T. Preston, R. D. Farish, 2240 Commerce Bldg., Houston, Tex.....	43
Waring, Gerald A., U. S. Geological Survey, Washington, D. C.....	23
Waring, W. W., 24 Kingston Rd., Scarsdale, N. Y.....	29
Warne, Archer Hurst, Richfield Oil Corp., 560 Haberfelde Bldg., Bakersfield, Calif.....	39
Warner, Charles A., Houston Oil Co., Box 2412, Houston, Tex.....	19
Warner, J. Laird, consulting, 248 N. Depot Rd., McAllen, Tex.....	30
Warner, Ralph E., Forest Development Corp., 1229 Milam Bldg., San Antonio, Tex.....	31
Warren, Howard C., c/o Ginther, Warren & Ginther, 1647 Esperson Bldg., Houston, Tex.....	28

## MEMBERS

411

Warren, John Edwin, Carl B. King Drilling Co., Box 270, Midland, Tex.	37
Warren, Lincoln Edgar, Bureau of Economic Geology, Univ. of Texas, Austin, Tex.	43
Warren, Walter Cyrus, U. S. Geological Survey, Box 385, Black Diamond, Wash.	43
Warthin, Aldred S., Jr., Dept. of Geology, Vassar College, Poughkeepsie, N. Y.	28
Wasem, Richard, 1607 Third Ave., N., Fort Dodge, Iowa	41
Wasserfallen, Bernard, Chambrelieu, Neuchatel, Switzerland	34
Wasson, Harold J., consulting, 25 Broadway, New York, N. Y.	27
Wasson, Theron, Pure Oil Co., Rm. 2308, 35 E. Wacker Dr., Chicago, Ill.	20
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Waters, Aaron Clement, Box 1738, Stanford University, Stanford University, Calif.	37
Waters, James A., Sun Oil Co., Box 2880, Dallas, Tex.	25
Waters, Joyce Irene, 208 Harris Ave., Hancock, Mich.	41
Watkins, Joe Henry, The Citadel, Charleston, S. Car.	43
Watson, C. P., Seaboard Oil Co., Rm. 970, 417 S. Hill St., Los Angeles, Calif.	25
Watson, Elizabeth Anne, 5823 Packard St., Los Angeles, Calif.	42
Watson, George R., Gulf Research & Development Co., Box 2038, Pittsburgh, Pa.	36
Watson, Joseph D., 1610 S. Norfolk, Tulsa, Okla.	21
Watson, Robert N., The Atlantic Refining Co., Box 895, Lake Charles, La.	38
Weatherby, Benjamin B., Geophysical Research Corp., Box 2040, Tulsa, Okla.	30
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Weaver, Charles E., Dept. of Geology, Univ. of Washington, Seattle, Wash.	34
Weaver, George A., Pure Oil Co., Fort Worth, Tex.	26
Weaver, Paul, Gulf Oil Corp., Drawer 2100, Houston, Tex.	20
Webb, James A., 527 Devine St., San Antonio, Tex.	30
Webb, John Hanor, Carter Oil Co., Box 150, Magnolia, Ark.	42
Webb, Riemann S., Auto Ordnance Oil Corp., 517 Union Natl. Bank Bldg., Wichita, Kan.	37
Weber, David M., Mene Grande Oil Co., Apt. 45, Barcelona, Venezuela, S. A.	43
Weddle, Herman W., Standard Oil Co. of California, Box 1200, Bakersfield, Calif.	29
Weeks, Albert W., Box 1536, University Sta., Austin, Tex.	27
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Weeks, Lewis G., Standard Oil Co. of New Jersey, Rm. 2150, 30 Rockefeller Plaza, New York, N. Y.	24
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Wegemann, Carroll H., Petroleum Administration for War, 320 First Natl. Bank Bldg., Denver, Colo.	20
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Weingartner, R. A., Stanolind Oil & Gas Co., Box 3092, Houston, Tex.	37
Weintz, Clement A., Stanolind Oil & Gas Co., Box 1092, Shreveport, La.	27
Weinzierl, John F., consulting, Lauratal, Riverside, Walker County, Tex.	22
Weir, James Donald, Dominion Oil Co., 700 Lancaster Bldg., Calgary, Alta., Canada	43
Weirich, T. E., Phillips Petroleum Co., Bartlesville, Okla.	21
Weisbord, Norman E., Socony-Vacuum Oil Co. C. A., Apt. 246, Caracas, Venezuela, S. A.	25
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Weller, J. Marvin, State Geological Survey, Urbana, Ill.	29
Wellings, Frank E., Iraq Petroleum Co., Ltd., Katamon, Jerusalem, Palestine	24
Wellman, Dean C., Pure Oil Co., Box 271, Tulsa, Okla.	37
Wells, Harris Peyton, Jr., 220 Minnesota Ave., Buffalo, N. Y.	42
Wells, John C., Standard Oil Co. of California, Box 101, Coalinga, Calif.	42
Wells, Murray J., Cities Service Oil Co., Box 1251, Bartlesville, Okla.	39
Wells, Robert Jackson, Richfield Oil Corp., 560 Haberfelde Bldg., Bakersfield, Calif.	43
Wells, Samuel W., Ashland Oil & Refining Co., 520 Citizens Natl. Bank Bldg., Evansville, Ind.	19
Welsh, LeRoy G., 707 Natl. Standard Bldg., Houston, Tex.	19
Weltman, Louis H., Louisiana Ordnance Plant, Shreveport, La.	41
Wenberg, Edwin Hugo, Rt. 2, West De Pere, Wis.	41
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Wengert, Sherman Alexander, 155 Homer St., Newton Centre, Mass.	42
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West, Donald Milton, The Island Development Co., Box 246, Charlottetown, P. E. I., Canada	41
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West, William Ward, Lario Oil & Gas Co., First Natl. Bank Annex, Midland, Tex.	35

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Wheeler, H. A., consulting, Security Bldg., St. Louis, Mo.	27
Wheeler, James Albert, c/o M. A. Taylor, Rt. 1, Lorena, Tex.	42
Wheeler, Orby Clinton, International Petroleum Co., 56 Church St., Toronto, Ont., Canada	26
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Wheeler, Russell Benson, The Texas Co., Box 252, New Orleans, La.	37
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Whipple, G. Leslie, Richmond Petroleum Co. of Colombia, Apt. 2760, Bogota, Colombia, S. A.	36
Whisenant, J. Barney, Whisenant & Trenchard, Commercial Standard Bldg., Fort Worth, Tex.	25
Whitaker, Harvey, independent, 1409 Milam Bldg., San Antonio, Tex.	31
Whitcomb, Bruce, Seaboard Oil Co., 1400 Continental Bldg., Dallas, Tex.	24
White, Albert William, c/o Mrs. C. M. Biolkowski, 2420 Arbor, Houston, Tex.	42
White, Daniel Jefferson, Jr., Salt Dome Oil Corp., Houston, Tex.	38
White, Gordon H., Shell Oil Co., Inc., Box 2099, Houston, Tex.	29
White, James Gordon, Rt. 1, Box H-1, Lolita, Tex.	39
White, Kessack D., Standard Oil Co. of New Jersey, 30 Rockefeller Plaza, New York, N. Y.	22
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White, Rex Harding, Magnolia Petroleum Co., Box 900, Dallas, Tex.	38
White, Richard D., The California Co., 1818 Canal Bldg., New Orleans, La.	37
White, Robert T., Barnsdall Oil Co., Los Angeles, Calif.	38
White, Tell Thompson, Securities & Exchange Commission, Rittenhouse Square, Eighteenth & Locust Sts., Philadelphia, Pa.	39
White, William Harris, The California Co., 1818 Canal Bldg., New Orleans, La.	43
Whitehead, W. L., Massachusetts Institute of Technology, Cambridge, Mass.	29
Whiting, Lester Leroy, The Texas Co., 338 Lumpkin Bldg., Mattoon, Ill.	38
Whitlach, George I., Tennessee State Planning Comm., 408 State Office Bldg., Nashville, Tenn.	42
Whitney, F. L., Univ. of Texas, Austin, Tex.	20
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Whitney, Paul A., General Geophysical Co., Box 187, Mt. Vernon, Ill.	24
Whitney, Paul B., Box 133, Grand Rapids, Mich.	23
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Whittier, William H., Department of the Interior, Salt Lake City, Utah	24
Whittinghill, Frank Thomas, Jr., 1930 Freeman Ave., Owensboro, Ky.	39
Whitwell, E. V., Oliphant Oil Corp., Commercial Bank Bldg., Shreveport, La.	19
Whorton, Raymond A., consulting, 423 Union Natl. Bank Bldg., Wichita, Kan.	35
Whorton, Chester D., Box 311, Coudersport, Pa.	29
Wiegand, Frederick William, Rt. 1, Lockhart, Tex.	36
Wilbert, Louis Joseph, Jr., 406 Church St., Plaquemine, La.	40
Wilcox, Fred H., Magnolia Petroleum Co., Box 900, Dallas, Tex.	29
Wilcox, Stanley William, Seismograph Service Corp., 709 Kennedy Bldg., Tulsa, Okla.	40
Wilder, Newell M., 155 Hamilton Park, Lexington, Ky.	38
Wilhelm, Arthur K., 704 Empire Masonic Bldg., Bartlesville, Okla.	28
Wilhelm, Oscar G., Shell Oil Co., Inc., Box 2099, Houston, Tex.	41
Willard, Max Emery, U. S. Geological Survey, Washington, D. C.	43
Williams, Carroll L., Humble Oil & Refining Co., Box 1311, Kingsville, Tex.	37
Williams, Charles Coburn, National Geophysical Co., 1002 Tower Petroleum Bldg., Dallas, Tex.	40
Williams, Francis S., consulting, 423 S. Maple, McPherson, Kan.	24
Williams, George Arthur, 212 S. Zinc St., Deming, N. Mex.	43
Williams, George C., consulting, 1843 W. Forty-seventh St., Los Angeles, Calif.	27
Williams, Herbert E., independent, 1712 Second Natl. Bank Bldg., Houston, Tex.	26
Williams, J. Stewart, Dept. of Geology, Utah State Agricultural College, Logan, Utah.	37
Williams, John Blaine, 2514 Stanmore, Houston, Tex.	43
Williams, John R., The Texas Co., Box 1737, Shreveport, La.	37

## MEMBERS

413

Williams, Lou, Pure Oil Co., Rm. 2308, 35 E. Wacker Dr., Chicago, Ill.	41
Williams, Meryl Dedrick, Texas University Lands, Box 1663, Midland, Tex.	42
Williams, Philip Anthony, Carter Oil Co., Box 2104, Billings, Mont.	41
Williams, Robert N., 2606 Chester Lane, Bakersfield, Calif.	38
Williams, Thomas B., consulting, 3406 Sixth St., W., Calgary, Alta., Canada	30
Williams, William Alfred, consulting, Box 265, Capitola, Calif.	19
Williamson, Harry, Arkansas Fuel Oil Co., 1704 Milam Bldg., San Antonio, Tex.	37
Williamson, Thomas F., Victoria Cottage, Pittenweem Fife, Scotland	32
Willis, Clifford L., Carter Oil Co., Box 206, Jena, La.	40
Willis, Cornelius G., 750 Subway Terminal Bldg., 417 S. Hill St., Los Angeles, Calif.	25
Willis, Robin, Hildon Oil Co., 1135 Subway Terminal Bldg., 417 S. Hill St., Los Angeles, Calif.	27
Willis, S. Morse, Carter Oil Co., Box 801, Tulsa, Okla.	24
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Wills, Neil H., consulting, Box 520, Carlsbad, N. Mex.	34
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Wilson, Cedric Clarke, Trinidad Petroleum Development Co., Ltd., Palo Seco, Trinidad, B. W. I.	40
Wilson, Charles Lewis, 405 S. Fifth St., Austin, Minn.	43
Wilson, Charles William, Jr., Vanderbilt University, Nashville, Tenn.	38
Wilson, Edward B., Sun Oil Co., Tyler, Tex.	22
Wilson, Ernest Bradley, Hogg Oil Co., 8th Floor, Great Southern Bldg., Houston, Tex.	41
Wilson, Eugene England, Geotechnical Corp., 1702 Tower Petroleum Bldg., Dallas, Tex.	40
Wilson, Forest Wayne, American Republics Corp., Petroleum Bldg., Houston, Tex.	40
Wilson, George M., State Geological Survey, 414 Natural Resources Bldg., Urbana, Ill.	43
Wilson, Ivan Franklin, U. S. Geological Survey, Edificio Imperial, Paseo de la Reforma 64, Mexico, D. F., Mexico	41
Wilson, James Ernest, Jr., Box 87, Rockdale, Tex.	40
Wilson, James Neff, Seismograph Service Corp., 709 Kennedy Bldg., Tulsa, Okla.	43
Wilson, Joe G., Texas Petroleum Co., Apt. 267, Caracas, Venezuela, S. A.	31
Wilson, John H., Independent Exploration Co., 2015 Fort Worth Natl. Bank Bldg., Fort Worth, Tex.	21
Wilson, Joseph M., independent, 707 Continental Bldg., Dallas, Tex.	22
Wilson, Malcolm E., General American Oil Co., Dallas, Tex.	20
Wilson, Richard M., The Ohio Oil Co., Box 1120, Shreveport, La.	38
Wilson, Thomas C., Venezuelan Atlantic Refining Co., Apt. 893, Caracas, Venezuela, S. A.	30
Wilson, Walter B., Gulf Oil Corp., Box 661, Tulsa, Okla.	21
Wimbish, Forrest E., Magnolia Petroleum Co., Box 1882, Wichita, Kan.	28
Wines, Donald Bradford, Midstates Oil Corp., Natl. Bank of Tulsa Bldg., Tulsa, Okla.	29
Winfrey, Donald B., Petty Geophysical Engineering Co., Box 2061, San Antonio, Tex.	31
Winham, W. P., Standard Oil Co. of California, Box 1200, Bakersfield, Calif.	28
Winkler, Bruno Oscar, Socony-Vacuum Oil Co. de Colombia, Calle 14 No. 8-22, Apt. 1140, Bogota, Colombia, S. A.	31
Winkler, Hans, 104 W. Thirty-second St., Austin, Tex.	31
Winkler, Virgil Dean, Standard Oil Co. of Venezuela, Caripito, Venezuela, S. A.	40
Winter, Niles B., The Atlantic Refining Co., Box 871, Midland, Tex.	24
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Winton, Will M., Texas Christian University, Fort Worth, Tex.	20
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Wise, Henry Francis, United Geophysical Co., Casilla 600, Punta Arenas, Magellanes, Chile, S. A.	42
Wise, James Sharples, Wise Drilling Co., Okmulgee, Okla.	42
Wissler, Stanley G., Union Oil Co. of California, Box 511, Compton, Calif.	27
Witherspoon, Edgar, 550 Funston Pl., San Antonio, Tex.	40
Woford, Henry Rollins, Jr., International Petroleum Co., Ltd., Guayaquil, Ecuador, S. A.	35
Wolcott, Richard Hastings, Sohio Producing Co., Mt. Pleasant, Mich.	43
Wold, John Schiller, c/o P. I. Wold, Union College, Schenectady, N. Y.	41
Wolf, Albert G., Texas Gulf Sulphur Co., 1009 Second Natl. Bank Bldg., Houston, Tex.	24
Wolf, George H., Box 452, Navasota, Tex.	43
Wolff, Deane J., Magnolia Petroleum Co., Box 900, Dallas, Tex.	23
Wolfram, Bertram, Jr., Seismic Exploration, Inc., 2911 Gulf Bldg., Houston, Tex.	43
Wolters, Earl M., 332 Columbine St., Denver, Colo.	30
Wolverton, Harold A., Halliburton Oil Well Cementing Co., Waggoner Bldg., Wichita Falls, Tex.	30

Womack, Brame, Sohio Producing Co., Box 145, Shreveport, La.	34
Wood, Fred E., Standard Oil Co. of Indiana, 910 S. Michigan Ave., Chicago, Ill.	24
Wood, George R., Standard Oil & Gas Co., Box 40, Casper, Wyo.	30
Wood, James T., Jr., The Texas Co., Pasadena, Calif.	24
Wood, J. Pendleton, 341 Marion St., Denver, Colo.	27
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Wood, Virgil O., Broswood Oil Co., 430 Beacon Bldg., Tulsa, Okla.	20
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Woodford, Alfred O., Pomona College, Claremont, Calif.	24
Woodring, Wendell P., U. S. Geological Survey, Washington, D. C.	43
Woods, E. Hazen, 2003 W. Brunson, Midland, Tex.	25
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Woodward, Truman Pendleton, 693 Canal St., Baton Rouge, La.	39
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Wright, Fred S., Box 1151, Midland, Tex.	20
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Wright, Hugh, Texas Gulf Sulphur Co., 812 Subway Terminal Bldg., Los Angeles, Calif.	30
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Wynn, Warren H., Sinclair Wyoming Oil Co., Box 283, Mt. Pleasant, Mich.	26
Wynne, Hal C., Phillips Petroleum Co., Guthrie, Okla.	36
Wyszynski, Otton Wiktor Theissberg, independent, 2118 N. Las Palmas Ave., Hollywood, Calif.	39
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Young, John A., Jr., Dept. of Geology, Michigan State College, E. Lansing, Mich.	43
Young, Keith P., Btry. A, 482nd A.A.A. Bn., Camp Hulen, Tex.	44
Young, Raymond Owen, Trinidad Leaseholds, Ltd., Forest Reserve, Trinidad, B. W. I.	42
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Yunck, George Feick, Pure Oil Co., Box 311, Olney, Ill.	39
Yzaguirre, Lauro Antonio, Apt. 2627, Mexico, D. F., Mexico.	43
Zaba, Joseph, Rio Bravo Oil Co., Houston, Tex.	33

## MEMBERS

415

Zadik, Jacob William, Preston Hollow, Dallas, Tex.....	'39
Zaikowsky, Michael Wladimir, Texas Petroleum Co., Apt. 267, Caracas, Venezuela, S. A.....	'43
Zapp, Alfred Dexter, U. S. Geological Survey, Univ. of Wyoming, Laramie, Wyo.....	'42
Zavoico, Basil B., Petroleum Administration for War, 7447 Interior Bldg., Washington, D. C.....	'25
Ziebold, William O., Spartan Gas Co., Box 766, Charleston, W. Va.....	'29
Ziegler, Frederick McClain, Kern Oil Co., Ltd., 354 S. Spring St., Los Angeles, Calif.....	'39
Zimmerman, Sam, Carter Oil Co., Box 512, Fort Morgan, Colo.....	'31
Zimmerman, Charles C., Keystone Exploration Co., Houston, Tex.....	'31
Zimmerman, James Z., consulting, Delmont, Pa.....	'22
Zinke, Ernest Clarence, 1715 Avenue N, Galveston, Tex.....	'39
Zoller, Lawrence J., Central Commercial Co., Box 2306, Tulsa, Okla.....	'21
Zorichak, Joseph J., Petroleum Administration for War, Denver, Colo.....	'24
Zuloaga, Guillermo, Standard Oil Co. of Venezuela, Caracas, Venezuela, S. A.....	'37
Zunino, Juan Jose, Servicio de Exploracion de Y. P. F., Vespucio, Provincia de Salta, Argentina, S. A.....	'42

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Loel, Wayne  
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Matter, John Emerson  
Maxson, John H.

# MEMBERS

417

McCloskey, Downs  
McCollough, Edward H.  
McMillan, John Robertson  
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Metzner, Loyde Henry  
Michelin, James  
Miller, J. Charles  
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PACIFIC PALISADES  
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MacDonald, Erwin H.

**TAFT—Barbat, William F.**  
Cerkel, J. David, Jr.  
Coben, Edward J.  
Ellison, Burton Rolland  
Graham, Joseph J.  
Porter, John Lewis  
Travers, William J., Jr.  
Turman, Arthur F.  
Woodward, Walter T.

**TEMPLE CITY—Mead, Roy G., Jr.**

**VENTURA—Clark, Alexander**  
Detrick, Dana F.  
Dibblee, Thomas W., Jr.  
Hawk, William Chester  
Hertel, Francis W.  
Leach, Claude E.  
Lewis, Lloyd Alan  
Merrill, William Raymond  
Sansone, John G.  
Smith, Lyle W.  
Stewart, R. E.

**VERNON—Merritt, Floyd C.**

**VISALIA—Neumann, Fred R.**

**WHITTIER—Bemis, Harold C.**

**WOODLAND**  
Reynolds, Sargent M.

## COLORADO

**BOULDER—Hubman, Carl W.**  
Thompson, Warren O.  
Woodbury, Homer Olwin

**CAMP CARSON**  
Swirczynski, R. P.

**COLORADO SPRINGS**  
Achning, Walter J.  
Anisgard, Harry William  
Beardsley, William R.  
Borax, Eugene  
Christenson, Alton Carl  
Mathias, Henry Edwin  
Osborne, Harry W.

**CORTEZ—Umbach, Paul Henry**

**DENVER—Ames, Edward W.**  
Aurand, Harry A.

Ball, Max W.  
Bass, Nathan W.  
Blair, Robert William  
Bosco, Francis Neal  
Brainerd, Arthur E.  
Christensen, H. E.  
Dobbin, Carroll E.  
Erdmann, Charles E.  
Fanshawe, John Richardson  
Fellows, Robert Arthur  
Frazier, Gaylord G.  
Fulton, Loris J.  
Goldsmith, Leo Jean  
Gow, Kenneth L.  
Harrison, John W.  
Harrison, Thomas S.  
Henderson, Charles W.  
Hendrickson, Victor J.  
Kramer, William B.  
Lavington, Charles S.  
Manion, Clarence E.  
McCready, Harry Joseph, Jr.  
McMillan, Robert  
Mellen, William P.  
Miller, David B.  
Miller, Richard F.  
Nelson, Walter S.  
Rath, Charles M.  
Reid, Robert P.  
Rennie, Waldo E.  
Robbins, Raymond W.  
Rohwer, Frank W.  
Sass, Louis Carl  
Shoenfelt, C. E.  
Snyder, Raymond W.  
Stewart, Hugh A.  
Thrasher, Glen Clair  
Turner, Joseph H.  
Volk, Russell H.  
Waggoner, Eugene B.  
Walter, Karl L.  
Wegemann, Carroll H.  
Wolters, Earl M.  
Wood, J. Pendleton  
Zorichak, Joseph J.

**ESTES PARK—Heaton, R. L.**

**FORT COLLINS**  
Stommel, Harrison Edfred

**FORT MORGAN**  
Zimmerman, Sam

**GILMAN—Gabelman, John W.**

**GLENWOOD SPRINGS**  
Ervin, Lynn Delbert

**GOLDEN—Curry, William H., Jr.**  
Heiland, Carl A.  
Johnson, J. Harlan  
LeRoy, Leslie Walter  
Mann, John F., Jr.  
O'Boyle, Charles C.  
Parker, Ben H.  
Tripp, Russell Maurice  
Van Tuij, Francis M.  
Wantland, Dart

**IDAHO SPRINGS**  
Conwell, Cleland N.

**LOVELAND**  
Bateman, Andrew F., Jr.

**PUEBLO—Marshall, Jesse William**

## CONNECTICUT

**GREENWICH—Hinds, Henry**

**NEW HAVEN—Bateman, Alan M.**  
Crickmay, Geoffrey W.  
Dunbar, Carl O.  
Longwell, Chester R.  
STOORS—Lucke, John B

## DELAWARE

**WILMINGTON**  
Budd, Montgomery Randolph  
Gillson, Joseph L.

## DISTRICT OF COLUMBIA

**ANACOSTIA—Hawes, Julian**

## FRIENDSHIP STATION

Straley, Harrison W., III  
WASHINGTON

Andrews, David Arthur  
Avery, C. Dwight  
Baker, Arthur A.  
Barnes, Sydney Urbane  
Billings, Martin Hewett  
Bleyberg, Arnold  
Boos, C. Maynard  
Bowles, Edgar Oliver  
Bronner, Finn Eyolf  
Browne, Gerard Lakin  
Buttermore, Paul M.  
Cassel, Chester  
Cloud, Preston E., Jr.  
Craig, Lawrence Carey  
Dane, Carle H.  
Dorr, John Van Nostrand, II  
Drach, Gertrude M.  
Dumbros, Nicholas George  
Farrell, Agnes M.  
Finch, Elmer H.  
Gallie, John Francis  
Gardner, Julia  
Geis, Wilfrid H.  
Gerdes, Carl Herman  
Greig, Douglas A.  
Grove, Brandon H.  
Henbest, Lloyd G.  
Hendricks, Thomas A.  
Heroy, William B.  
Heston, J. Ed.  
Hoffer, Clarence W.  
Hoffman, Malvin G.  
Hughes, Richard V.  
Imlay, Ralph Willard  
Jones, J. Byron  
Kaiser, George B.  
King, Philip B.  
Knechtel, M. M.  
Krumbain, William C.  
Kyle, Jerry Robert  
Lang, W. B.  
Lewis, J. Volney  
Lott, Frederick S.  
Loughlin, Gerald F.  
Mackay, Donald K.  
Mackenzie, Andrew N.  
MacNeil, F. Stearns  
Mayfield, William W.  
Miller, John Robson  
Miser, Hugh D.  
Moore, Raymond C.  
Needham, Claude E.  
Notestein, Frank B.  
Nye, S. Spencer  
Payne, Thomas Gibson  
Pierce, William Gamewell  
Putnam, William Clement  
Reeside, John Bernard, Jr.  
Reeves, Frank  
Richards, Ralph W.  
Rodgers, John  
Rubey, William W.  
Sayre, Albert Nelson  
Sears, Julian D.  
Somers, George B.  
Speed, Carleton D., Jr.  
Spratt, Robert Elmer  
Stead, Frank W.  
Stephenson, Lloyd W.  
Stipp, Thomas F.  
Stringfield, Victor Timothy  
Tapp, Theodore Leland  
Taylor, Josiah  
Terrill, John V.  
Townsend, Rex M. F.  
Trager, Earl A.  
Trask, Parker D.  
Van Orstrand, C. E.  
Vaughan, T. Wayland  
Walters, Mason G.  
Waring, Gerald A.  
Willard, Max Emery  
Woodring, Wendell P.

Wrather, William Embry  
Zavico, Basil B.

## FLORIDA

AVON PARK  
Tennis, Langdon Carlisle  
CHIPLEY—Taegle, John  
CORAL GABLES  
Huntley, Louis Guy  
EAU GALIE—James, Wright E.  
EGLIN FIELD—Heid, Gordon W.  
EUSTIS—Kinser, James Hanford  
FT. MYERS  
Bachman, Ford Frederick  
Stapp, Wilford Lee  
FT. PIERCE  
Leonard, Clarence Ziegler  
GULF HAMMOCK  
Campbell, Robert B.  
MIAMI  
McC Campbell, William G., Jr.  
Parker, Garald Gordon  
Wold, John Schiller  
QUINCY—Moses, Carl Edward  
ST. PETERSBURG  
Stevens, Edward H.  
TALLAHASSEE—Gunter, Herman  
Martin, James Littell, Jr.  
Munroe, Donald J.  
Ponton, Gerald M.  
Rainwater, Edward Harriman  
Rand, William W.  
Sellin, Hilding A.  
Stubbs, Sidney A.  
Swesnik, Robert Malcolm  
TAMPA—Lewis, Jerry Burton  
Mills, Coe S.  
Pressler, Edward D.

## GEORGIA

ATLANTA  
Pelt, Chester Robert  
DECATUR—Pirkle, E. C., Jr.  
EMORY UNIVERSITY  
Munyan, Arthur C.  
FT. McPHERSON  
Edwards, Acus Rex

## ILLINOIS

ATLANTA—Mountjoy, Joseph B.  
BENTON—Hockman, James N.  
CARM—English, Robert M.  
Turnbull, Wade William  
Whitney, Fred L.  
CENTRALIA  
Breed, Edw. R., Jr.  
Brown, Orman Pearson  
Caylor, Garth William  
Ellsworth, Elmer W.  
Farlee, Richard Wilson  
Frey, Alfred P.  
Hager, Dorsey  
Hardin, Clifford Garland  
Jensen, Frederick T.  
Lester, John Lawrence  
McNeal, Robert Paul  
Mylus, L. A.  
Norling, Donald L.  
Shakely, Ed.  
Simmons, Kenneth A.  
CHAMPAIGN—Folk, Stewart  
CHICAGO

Aishar, Freydown Azadi  
Camon, Joe  
Cram, Ira H.  
Cronis, Carey  
Gross, Henry Emmett  
Hadley, Herbert David  
Hoffman, Arnold D.  
Newcombe, Robert J. B.  
Parsons, Kenneth R.  
Thomas, Harold S.  
Wadell, Hakon A.  
Wasson, Theron  
Williams, Lou  
Wood, Fred E.

CICERO—Potsch, John Peter  
EFFINGHAM—Collins, P. D., Jr.  
ELIZABETHTOWN  
Hardin, George C., Jr.  
EVANSTON—Ball, John Rice  
Dapples, Edward C.  
FAIRFIELD  
Calvert, Warren Lytle  
FRANKFORT  
Carman, Katharine W.  
MARSHALL—Bristol, Hubert M.  
Kurtz, Robert G.  
Sternberg, Charles William  
MATTOON—Anderson, Carl B.  
Anderson, Rudolph F.  
Brown, Otto E.  
Cartmell, William Martin  
Dana, P. L.  
Farmer, Paul  
Harris, Lloyd Addis  
Hicklin, Richard Stuart  
Hirsch, Jack  
Lamar, Lee C.  
Lewick, James Edward  
McHugh, James W.  
Morgan, Lindsey G.  
Simonton, Owen W.  
Stratton, Everett F.  
Whiting, Lester Leroy  
MT. CARMEL—Egan, Martin G.  
MT. VERNON  
Brehm, Clarence E.  
Ferebee, D. M.  
Hruby, Milton  
MacQuown, William C., Jr.  
Moore, Fred Holmsley  
Obering, Ernest A.  
Rehn, Edgar Ernest  
Smith, Julian W.  
Straughan, George M.  
Tuck, Louis Lester  
Walcher, Wayne E.  
Wall, Thomas E.  
Whitney, Paul A.

NASHVILLE  
Hunzicker, Ashley Andrew  
NEWTON—Dana, Drexler  
ONEY—Cronin, K. Stewart  
Gaddess, Gene  
Green, Darsie A.  
Gulde, Andros  
Mitchell, James G.  
Yunck, George Feick  
PRINCETON  
Becker, Leroy Everett  
ROBINSON—Davies, Nathan C.  
ROSCILARE—Brecke, Ervin A.  
Sutton, Arle Herbert  
SALEM—Martin, Robert Henry  
Marvin, Guard Scott  
SPRINGFIELD—Noll, Donald E.  
Raman, Norman Dean  
URBANA—Arper, William B., Jr.  
Bell, Alfred H.  
Carter, Charles William  
DeWolf, Frank W.  
Easton, William Heyden  
Hanes, Vincent Eugene  
Hiller, Carl Frederic  
Jones, Verner  
Leighton, Morris M.  
Pullen, Milton William, Jr.  
Scott, Harold William  
Speziale, Dorothy B.  
Tippie, Frank Emerson  
Townley, Enid  
Wanless, Harold R.  
Weller, J. Marvin  
Wilson, George M.  
Workman, Lewis Edwin  
VANDALIA  
Buehner, John Hubert

## INDIANA

ANDERSON—Brown, Ira Otho  
BLOOMINGTON—Esarey, Ralph E.

Fender, Hollis Blair  
Franklin, Donald Wilbert  
Galloway, Jesse J.  
Spencer, Charles Grason  
ELWOOD—Boling, Kenneth G.  
EVANSVILLE  
Barbour, Richard M.  
Bodkin, Hillard Winton  
Burke, Doyle Michael  
Bybee, Halbert Homer  
Cahill, Edgar D.  
Chasey, Kenneth LeMay  
Clay, Withers  
Cole, Edwin G.  
Combs, Edward J.  
Cooper, Russell Calvin  
Crouse, George T.  
David, Max  
Eberhardt, Adolph T.  
Eberle, Robert Francis  
Edwards, Hall  
Elder, Stanley G.  
Falletti, Antone D.  
Farrand, William Gardner  
Fisher, Frank Lynn, Jr.  
Georgesen, Niels Christian  
Hengst, Jess H.  
Hones, Charles W.  
Hudson, Oscar McDonald  
Ingham, W. I.  
Latimer, Fred Hubert  
Morton, Robert Brading  
Nowlan, Harry H.  
Piggott, Guido M., Jr.  
Poteet, James Harold  
Pye, Willard D.  
Reeves, James E.  
Rogers, Maynard  
Sackett, H. F.  
Siberts, Carl Edwin  
Snider, George W.  
Stith, Sam Henry, Jr.  
Sutton, Donald G.  
Taylor, George E.  
Ward, Roderick C.  
Wells, Samuel W.  
Wesley, George Rutherford  
FARMERSBURG—Heap, George E.  
FT. WAYNE  
Parker, Norbert Allen  
GREENCASTLE  
Smith, Ernest Rice  
INDIANAPOLIS  
Hagan, Wallace W.  
Hake, Benjamin F.  
Hudgens, Clyde O.  
Keller, P. Hastings  
Longmire, William R.  
Mundorf, T. Dean  
Scobey, Ellis Hurlbut  
LAFAYETTE—Morgan, Ray E.  
MONTICELLO  
Baer, Daurice Frank  
MUNCIE—Hoover, W. Farrin  
PRINCETON  
Mauck, Melvin Dwight  
SOUTH BEND  
Smith, Knowles B.  
VINCENNES—Sprowls, Harlan A.  
WHITING  
Shaeffer, Stanley Beaubien

## IOWA

CEDAR RAPIDS—Vesely, Leon R.  
CLEMONS—Burkhead, Wayne Z.  
COIN—Goodman, Herbert M.  
COUNCIL BLUFFS  
Damon, Frederic Thomas  
FT. DODGE—Wasem, Richard  
IOWA CITY  
Kummel, Bernhard, Jr.  
Miller, Arthur K.  
Tester, Allen C.  
Trowbridge, Arthur C.  
MT. PLEASANT  
Smith, Marcus A. J.

## MT. VERNON

Bennett, Robert Turner  
 SIOUX CITY  
 O'Brien, Joseph Alfred  
 WINFIELD—Lonsdale, John T.

## KANSAS

ABILENE—Verckler, Stewart P.  
 ANTHONY—Lang, William J.  
 Meyer, Ruskin H.  
 BARNARD—Tucker, Paul M.  
 BUCKLIN—Madden, Lloyd Willis  
 CHASE—Price, Arthur S.  
 COLUMBUS—Martin, V. Dale  
 COTTONWOOD FALLS  
 Hilton, Willard O.  
 CUNNINGHAM  
 Lillibridge, Frederick S.  
 EL DORADO  
 Berry, George F., Jr.  
 Sprague, William B.  
 ELK FALLS—Stoker, Carl E.  
 FREDONIA—Stryker, William L.  
 GODDARD  
 Decker, Willis Mansfield  
 GREAT BEND—Denman, C. E.  
 Knight, L. Clark  
 McCullough, Russell L.  
 McDaniel, Fred  
 Prescott, Gordon W.  
 Shannon, Sherril A.  
 HAYS—Messman, Roger  
 HERINGTON  
 Hatheway, Joseph G.  
 INDEPENDENCE  
 Lee, Thomas William  
 Studd, Charles W.  
 IOLA—Conley, J. N.  
 Page, James H.  
 KANSAS CITY  
 Hawkins, Harold H.  
 LAWRENCE—Brown, Silas C.  
 Jones, Ogden S.  
 Laudon, Lowell R.  
 Leatherock, Constance  
 Lee, Wallace  
 McLaughlin, Thad G.  
 Stephenson, Eugene A.  
 Swineford, Ada  
 Thompson, Marcus Luther  
 LYONS—Edwards, Harold S.  
 Taylor, M. Hall  
 MANHATTAN  
 Skinner, John Wesley  
 MCPHERSON—Williams, Francis  
 NEWTON—Rouse, John Thomas  
 OBERLIN  
 Brewer, Ralph Roche, Jr.  
 PITTSBURG  
 Abernathy, George Elmer  
 RUSSELL  
 Riise, John Anderssen, Jr.  
 SEDAN—Disney, Orville A.  
 TOPEKA—Allen, Deyvere F.  
 Clair, Joseph Robinson  
 WELLINGTON  
 Matthews, Charles L.  
 Matthews, Edwin Patterson  
 WICHITA—Abbott, Wayne Rosser  
 Avey, Charles Samuel  
 Ainsworth, David  
 Allan, Thomas H.  
 Allen, Donald M.  
 Ashley, Burton Edward  
 Barwick, John S.  
 Baughman, George W.  
 Bear, Melvern Fred  
 Beebe, B. W.  
 Bond, Henry Lofland  
 Boreing, Myriel James  
 Bowser, William F.  
 Bradley, Everett L.  
 Brewer, John Edward  
 Brooks, Benton Snow, Jr.  
 Brooks, Frank M.  
 Bruce, George H.

## Bryant, Howard S.

Buck, Loren I.  
 Buehler, Karl Martin  
 Bunte, Arnold S.  
 Butcher, Seldon D.  
 Carlson, Edwin N.  
 Carmody, Robert Arthur  
 Carpenter, E. Gail  
 Cheyney, Alvin E.  
 Clark, James Edward  
 Clark, Robert Scarth  
 Cline, Wilford L.  
 Cole, Virgil B.  
 Conselman, Frank B.  
 Cooper, C. Harrison  
 Copans, Jack M.  
 Cornell, Lee H.  
 Costa, Delbert J.  
 Dahl, Arnold C.  
 Daniels, James I.  
 Davis, Horace Chesterfield  
 Dunn, Burton Crawford  
 Edens, Jack Cloyd  
 Edmiston, Elliott K.  
 Elledge, Emmett R.  
 Everett, Rizer  
 Folger, Anthony  
 Fortier, Leo R.  
 Galley, John E.  
 Gardner, Jack Winston  
 Garlough, John L.  
 George, Robert Freeman  
 Given, Robert J.  
 Hall, Roy H.  
 Harbison, Robert R.  
 Harder, Robert P.  
 Harper, Paul Ashton  
 Hay, Lawrence C.  
 Heathman, Jack Hastings  
 Heathman, Walter W.  
 Herring, Frank  
 Holl, Frederick G.  
 Hoover, Janet  
 Howell, W. F.  
 Huffman, Edward A.  
 Imbt, William C.  
 Inkster, John W.  
 Jager, Eric Howard  
 Johns, Walter W. S.  
 Johnston, Robert L.  
 Keenan, James Edward  
 Kesler, L. W.  
 Koester, Edward A.  
 Kralis, Dan F.  
 Lamb, Ralph Charles  
 La Peire, George W.  
 Larkin, John Jennings, Jr.  
 Larsh, Walter W.  
 Lee, Marvin  
 Low, Julian W.  
 Maddox, Gerald C.  
 McHugh, William Ernest  
 McMurtry, Wilbur Earl  
 McNeely, Robert B.  
 McNeil, Harold E.  
 Metcalf, Myron C.  
 Mettner, Francis Edwin  
 Meyer, Robert Frederick  
 Michaelson, Louis Henry  
 Moncrief, E. C.  
 Moody, Ray R.  
 Morgan, L. C.  
 Mull, J. A., Jr.  
 Oyster, Frank A.  
 Paddleford, Jack Teal  
 Peters, Theodore Clinton  
 Philbrick, Eugene P.  
 Powers, Delmer L.  
 Pratt, Ernest S.  
 Quesenberry, Alice Mildred  
 Ralstin, James F.  
 Redmon, Harold E.  
 Reid, Kenneth James  
 Reiserer, Victor Fletcher  
 Richards, Ben Howard, Jr.  
 Roberts, Richard Lee

## Roberts, Thomas N.

Roop, Charles W.  
 Russell, Harry Jones, Jr.  
 Sammons, George B.  
 Scholdt, Walter Carl  
 Selk, Erwin L.  
 Smedley, Harold O.  
 Smith, John Peter  
 Smith, Millard Wesley  
 Snider, Clark Thomas  
 Speer, George Woodrow  
 Stafford, Clare J.  
 Sullivan, Chris Rice  
 Talbott, W. G.  
 Trager, Hugh Harold  
 Utterback, Claude  
 Ver Wiebe, Walter A.  
 Vickery, Ward R.  
 Waddell, Richard Kent  
 Webb, Riemann S.  
 Whorton, Raymond A.  
 Wilson, Kenneth M.  
 Winbush, Forrest, E.  
 Winzeler, Alvin Raymond  
 Woodward, Harold Robinson  
 Woolley, Glen C.  
 Wright, Thomas Goodman  
 WINFIELD—Cooper, James Blair

## KENTUCKY

ASHLAND—Browning, Iley B.  
 Hunter, Coleman D.  
 Thomas, Ralph Nelson  
 BOWLING GREEN  
 Newton, William A.  
 ELIZABETHTOWN  
 McClure, Perry S.  
 GLASGOW—Preston, J. Basil  
 LEXINGTON  
 Branson, Carl Colton  
 Freedman, Louise Barton  
 Jones, Daniel J.  
 McFarlan, Arthur Crane  
 Miles, Phil Middleton  
 Wilder, Newell M.  
 LOUISVILLE  
 Stouder, Ralph Eugene  
 MAYHWE  
 Mayhew, Eldon Jay  
 OWENSBORO—Brown, J. Albert  
 Damron, Wallace  
 Donnelly, Clarence W.  
 Payne, James Norman  
 Shiarella, Nicholas W.  
 Whittinghill, Frank R., Jr.  
 PAINTSVILLE  
 Jenkins, Philip  
 SOMERSET—Emmerich, Harry H.

## LOUISIANA

ABBEVILLE—Reeves, J. R.  
 ALEXANDRIA  
 Richardson, Felix Dorman  
 BASTROP  
 Stanley, Thomas B., Jr.  
 BATON ROUGE  
 Ackley, Kenneth A.  
 Aycok, Lester Charles  
 Bell, Harry Wesley  
 Blackwell, William G.  
 DeBlieux, Charles  
 Dunbar, Clarence P.  
 Fisk, Harold N.  
 Harang, Jack Francis  
 Hendy, William James, Jr.  
 Henson, Gurrie K.  
 Howe, Henry V.  
 Huner, John, Jr.  
 Jones, Paul Hastings  
 Lyons, Percy Marvin  
 Maher, John C.  
 Manning, Lloyd R.  
 Mayer, Maurice J., Jr.  
 Mitchell, Mark William  
 Orchard, Paul Joseph  
 Romans, William A.

## Roy, Chalmers J.

Rukas, Justin Matthew  
 Russell, Richard Joel  
 Smith, Robert Hendee  
 Sprague, Robert D.  
 Woodward, Truman P.  
 BURAS—Eskridge, Tatham R.  
 CAMP CLAIBORNE  
 Tennant, Robert Hudson  
 CROWLEY—Ferrero, Clarence  
 Frank, Anne Moring Robins  
 Patton, Jacob L.  
 DE RIDDER—Iles, George, Jr.  
 EUNICE—Vincet, Mordele L., Jr.  
 GEISMAR—Roberts, Marion S.  
 GOOD PINE—Howard, Douglas D.  
 GREINA—Kipp, Earl Mathew  
 GUEYDAN  
 Allardyce, Robert L., Jr.  
 Manes, Oscar Bob  
 HOUMA—Bolyard, Garrett L.  
 Broughton, M. N.  
 Loomis, Frederick  
 Brewster, Jr.  
 Ronbeck, Arthur Charles  
 Seashore, Paul T.  
 JEANERETTE  
 Robichaux, Douglas B.  
 JENA—Willis, Clifford  
 LAFAYETTE—Bates, Fred W.  
 Beckman, Michael William  
 Bernard, Hugh Allen  
 Bingham, Dwight H.  
 Bornhauser, Max  
 LeRoy, Tom E.  
 Miller, Albert Douglas  
 Pennel, Harry David  
 Sands, Charles Dudley  
 Traupe, Lloyd Desmond  
 Wharton, Jay Bigelow, Jr.  
 LAKE CHARLES  
 Baysinger, Eugene M.  
 Canada, William Richards  
 Henning, John L.  
 Mahoney, John Francis  
 Morrow, A. Lyndon  
 Roach, Cyril Bloomfield  
 Schoenck, Philip S.  
 Timm, Bert Clifford  
 Watson, Robert N.  
 LAKE PROVIDENCE  
 Houston, Sam H., Jr.  
 LECOMPT  
 Addington, Harold W.  
 MONROE—Fergus, Preston  
 McAuliffe, Gilbert C.  
 NATCHITOCHES  
 Fuelhart, Donald E.  
 NEW IBERIA  
 Sparenberg, G. R.  
 NEW ORLEANS  
 Arnold, Emmett L.  
 Atwater, Gordon I.  
 Babin, Logan Henry  
 Bay, Harry X.  
 Bremer, Bernhard E.  
 Bybee, Robert William  
 Calahan, Luther Weldon  
 Casey, J. Ben  
 Chorney, Raymond  
 Colle, Jack Overton  
 Copeland, Robert R., Jr.  
 Crandall, Kenneth H.  
 Davies, Herman F.  
 Denham, Richard Lane  
 Dobrick, Edward G.  
 Efinger, William Lloyd  
 Everett, Robert Walter, Jr.  
 Fox, James P.  
 Gaby, Edwin D.  
 Goerner, Fred Stephen  
 Gulmon, Gordon Wesley  
 Hadley, Wade H., Jr.  
 Hickey, Harold N.  
 Holmer, Ralph Carroll  
 Hoover, J. Wilkinson  
 Hudson, Joe Bailey

Jackson, Alvin M.  
Little, Sterling E.  
Lund, Gage V.  
Marshall, Dan L.  
Metts, Dean Francis  
Nichols, Ernest T.  
Nichols, Ivan K.  
Partridge, John F., Jr.  
Payne, Willard M.  
Petersen, Harluf C.  
Petersen, Morton Q.  
Reed, Irvin John  
Richards, Edward F.  
Richardson, H. T.  
Schall, Fred Muller, Jr.  
Schneider, G. W.  
Shepherd, George F.  
Smith, Neal Johnstone  
Taylor, Ralph E.  
Todd, James Hopkins  
Wall, Earle R.  
Wheeler, Russell Benson  
White, Richard D.  
White, William Harris

## PLAQUEMINE

Barry, John O'Keefe  
Forward, Frederick W.  
McNally, Perry Michael  
Wilbert, Louis J., Jr.  
PORT ALLEN—Wright, Randall  
RAYNE—McLendon, Dan Harvey  
RUSTON—Laskey, G. E.

## SHREVEPORT—Aimer, James D.

Barret, William M.  
Bartell, Laurence D.  
Barton, Louis A.  
Beck, Robert W.  
Becker, Raymond C.  
Blanpied, B. W.  
Borden, S. P.  
Bredlove, Robert L.  
Brockway, E. R.  
Buchner, Harry M.  
Caster, Ermil Leslie  
Cheesman, Beynon Sale  
Clark, Chester C.  
Cochran, Phil K.  
Corbin, Milton Wallace  
Cox, Herbert Mack  
Cridler, Albert F.  
Crow, Louis Milton  
Eaves, Everett  
Fischer, LeRoy Fred  
Fischer, Victor N.  
Flesh, David James  
Forgotson, James M.  
Freed, Richard  
Goebel, Lawrence A.  
Goldstein, August, Jr.  
Grage, Victor P.  
Grigsby, Garland O.  
Hardin, Vern A.  
Harlowe, Leslie S.  
Harris, Roy  
Hazzard, Roy T.  
Hier, Charles Douglas  
Hofmeister, William S.  
Hoke, Charles Jacob  
Holden, Frederick Thompson  
Hutson, E. B.  
Ingham, Albert Irwin  
Jones, John Percy  
Kamb, Hugo R.  
Kimball, Edgar W.  
Kreidler, William Lynn  
Lancaster, L. Kenneth  
Lytle, J. Edward  
Magale, John F.  
Marmaduke, Richard Calvin  
Marshall, Leslie R.  
Marshall, Walter Hill  
McCall, Charles Louis  
McCasland, Barney C., Jr.  
McFarland, L. R.  
McLaren, Robert L.  
McMahon, Joe Trees

Meltzer, Lee Hillard  
Mix, Sidney E.  
Monson, Edward  
Moody, Clarence L.  
Moody, John D.  
Packard, Sidney A.  
Parkard, Lloyd S.  
Philpott, Thomas Hughes  
Purzer, Joseph  
Robinson, Van Daniel  
Safonov, Anatole  
Schwartz, Channing B.  
Shamblin, W. Earle  
Sherwin, Melville Williams  
Smith, Lloyd B.  
Spears, Walter H.  
Spofford, Howard N.  
Spooner, W. C.  
Steinmayer, R. A.  
Stewart, Charles A.  
Thomas, George Dewey  
Tierney, James A.  
Tuttle, Frances  
Van Gilder, H. R.  
Vernon, Benton R.  
Wallace, William Edwin, Jr.  
Walton, George Goodrich  
Weeks, Warren B.  
Weintz, Clement A.  
Weltman, Louis H.  
Whitley, James Moulton  
Whitwell, E. V.  
Williams, John R.  
Wilson, Richard M.  
Womack, Brame  
Wynn, Albert  
Young, Jackson S.

SULPHUR—Farley, William R.  
Kilian, Harry  
May, George Nolan  
Moore, James A.  
WAKEFIELD  
Kilbourne, Lewis P.  
WHITE CASTLE  
Nelson, Raymond T.  
WINNFIELD  
Wade, Rolla Theadore

## MARYLAND

BALTIMORE—Dorsey, Geo. Edwin  
Nance, Jack B.  
Singewald, Joseph T., Jr.  
Strothmann, Frederick H.  
CHEVY CHASE—Crowell, John H.  
Darton, N. H.  
Mendenhall, Walter C.  
SILVER SPRING  
Revelle, Roger R. D.

## MASSACHUSETTS

BOSTON—LaCroix, Morris F.  
CAMBRIDGE—Beers, Roland F.  
Goodman, Clark  
Mather, Kirtley F.  
Oliphant, Charles W.  
Sheppard, Charles Wilcox  
Whitehead, W. L.  
EVERETT—Haskell, Norman A.  
MEDFORD—Lane, Alfred C.  
NEEDHAM HEIGHTS  
Adams, Clyde B.  
NEWTON CENTRE  
Wengert, Sherman Alexander  
NORTHAMPTON  
Shaub, Benjamin Martin  
QUINCY—Parhiala, Leimo L.  
SHARON—Cushman, Joseph A.  
SPRINGFIELD—Robinson, Joseph  
VINEYARD HAVEN  
Hotchkiss, Henry  
WOODS HOLE—Hough, Jack Luin

## MICHIGAN

ALLEGAN—Nicola, Oliver P., Jr.  
ANN ARBOR—Belknap, Ralph L.  
Cohoe, George V.

Eardley, Armand John  
Kellum, Lewis B.  
Landes, Kenneth K.  
Otton, Edmond George, III  
CARO—Sklar, Maurice  
CASSOPOLIS  
Bishop, Margaret Stearns  
CLARK—Cook, Everett Earl  
Fugate, Ross James  
GRAND RAPIDS  
Knife, R. E.  
Smith, Robert Harlow  
Whitney, Paul B.  
Wyckoff, J. W.  
HANCOCK—Waters, Joyce Irene  
IRON RIVER—Clark, Lorin D.  
JACKSON—Gentry, Howard L.  
LANSING—Boyd, Harold E.  
de Cousser, Kurt H.  
Grant, Rex Potter  
Martin, Helen M.  
Smith, Richard A.  
Young, John A., Jr.  
LUDINGTON—James, Jay R.  
MIDLAND—Alquist, Francis N.  
MT. PLEASANT—Boos, Edward J.  
Branson, Edwin Robert  
Brown, William F.  
Clark, William A.  
Hunt, Raymond S.  
Jenkins, Page T.  
Osgood, Manley, Jr.  
Schulz, William B.  
Sleight, Glenn C.  
Stewart, Norman Robert  
Thomas, William A.  
Wolcott, Richard Hastings  
Wynn, Warren H.

ROMULUS—Tomplins, J. D.  
SAGINAW—Addison, Carl C.  
Baltrusaitis, Edward J.  
Becker, Ralph Edward  
Clark, Charles Koogle  
Engstrand, Clinton  
Hand, Hiram Darby  
Kirkham, Virgil R. D.  
Maebius, Jed B.

## MINNESOTA

AUSTIN—Wilson, Charles L.  
CAMP SAVAGE—Taber, E. C., Jr.  
MINNEAPOLIS—  
Donovan, Percy W.  
Emmons, William H.  
Miller, Lloyd E.  
Stauffer, Clinton R.

## MISSISSIPPI

CAMP SHELBY—Liming, John A.  
CANTON—Howard, George Carl  
Morrill, Junius Houghes  
COLUMBUS—Flude, John William  
FOREST—Meagher, David Pope  
JACKSON—Alexander, Clyde W.  
Blanchard, Frank N., Jr.  
Braunstein, Jules  
Buck, Charles E.  
Chawner, William Donald  
Cram, Edward C.  
Dennis, Lyman Clark  
Fry, Earl E.  
Gosnell, George E.  
Grubb, Carl F.  
Grubbs, David M.  
Guest, Henry Grady  
Harrell, David C.  
Harris, R. Merrill  
Herring, Donald G., Jr.  
Hughes, Urban B.  
Jeffrey, Geoffrey  
Kennedy, John B.  
McGlothlin, Tom  
Mellen, Frederic Francis  
Michael, James F.  
Miller, Harold O.  
Monson, Eli T.

Morgan, Cecil L.  
Murray, Grover, Jr.  
Musselman, George A.  
Rand, Raymond A.  
Reese, Donald M.  
Schmidt, Karl A.  
Schmotzer, Julius William  
Seedle, Charles William  
Simons, James A.  
Spoonier, Knight Keith  
Stephenson, Cuthbert D.  
Storey, Joseph B.  
Talley, Gilbert Arthur  
Toler, Henry N.  
Yoder, George M.  
LAUREL—Reed, Paul Carty  
Wendenburg, Otto  
NATCHEZ—Swords, Henry L.  
OXFORD—Monroe, Watson H.  
TUPELO—Jenkins, George M.  
UNIVERSITY—Brown, Glen F.  
Morse, William C.  
Sawyer, Finis Mack  
VICKSBURG  
Agee, Flint Humphrey  
Brown, Leonard Irving  
Dyk, Robert  
Melsheimer, Albert Harry

## MISSOURI

COLUMBIA—Branson, E. B.  
Burling, Lancaster D.  
Curtis, Lawrence Wilford  
Mehl, M. G.  
Ostrander, Allen Roys  
FAIRFAX—Portis, Richard Wayne  
FLOISSANT  
Echols, Dorothy Jung  
INDEPENDENCE—Davis, Gene O.  
JOPLIN—Fowler, George M.  
KANSAS CITY  
Anderson, Kenneth Clyde  
Austin, Robert Burton  
Burt, Roy A.  
Smith, Rufus McBride  
MAYSVILLE  
Outgley, Claude M., Jr.  
MOUNTAIN VIEW  
Ferrell, Max Everett  
PLATTE CITY—Abbey, Gerald E.  
ROLLA—Buehler, H. A.  
Dake, Laurence F.  
Ellison, Samuel F., Jr.  
Greene, Frank C.  
Kinney, Douglas Merrill  
Mulenburg, Garrett A.  
ST. LOUIS—Bakke, W. E.  
Hinchey, Norman S.  
Irwin, Carl B.  
Stearn, Noel H.  
Wheeler, H. A.  
Yenne, Keith Austin  
WEBSTER GROVES  
Buchner, Carl F.

## MONTANA

BILLINGS—Berg, Karl A. E.  
Blackstone, Donald L., Jr.  
Bramlette, William Allen  
Downs, George Reed  
Evans, Vincent  
Hornung, Arthur C.  
Huey, Arthur Sidney  
McCoy, Alexander W., III  
Miller, Guy E.  
Neiler, William Dixon  
Seager, Oramel Ainsworth  
Shay, D. C.  
Surber, Nathan Courtney  
Williams, Philip Anthony  
BUTTE—Sloss, Laurence Louis  
CHATEAU—Alpha, Andrew G.  
CUT BANK—Hupp, John Ervin  
McConnell, Robert B.  
McCourt, James H.  
Sullivan, Albert Martin

## GREAT FALLS

Buddenhagen, H. J.  
Greene, Ray G.  
Peden, William M.  
HELENA—Ellis, John Reese  
SHELBY—Blixt, John Elmer  
Cobban, William Aubrey  
Hackbarth, Robert Earle

## NEBRASKA

BLAIR—Newell, Donald Frost  
FALLS CITY—Earl, Will F.  
KEARNEY—Turner, Johnathan D.  
LINCOLN—Bates, Charles C.  
Cast, Richard Frederick  
Lugn, A. L.  
Reed, Eugene C.  
Scherer, Oliver J.  
Schramm, E. Frank  
Souther, John B.  
Tichy, James K.  
NEWMAN GROVE  
Gutru, Robert J.  
OMAHA—Day, James R.  
SEWARD—Rogers, Wilbur Frank

## NEVADA

PIOCHE—Bacon, Charles S., Jr.  
STEAMBOAT—Bain, H. Foster

## NEW HAMPSHIRE

CONCORD—Gisburne, John R.

## NEW JERSEY

ASBURY PARK  
Loring, Ralph Crapo  
DEERWATER—Graham, David H.  
ELIZABETH  
Jameson, Maynard H.  
GREEN VILLAGE  
Conway, William Palen, Jr.  
MAHWAY—Brazil, James Joseph  
MALVERNE  
Knutson, Clarence J.  
PRINCETON  
Fox, Steven Knowlton  
Knight, J. Brookes  
Sampson, Edward  
Thom, W. T., Jr.  
SOMERVILLE—Smith, Norman C.  
TENAFLY—Lilley, Ernest R.

## NEW MEXICO

ALBUQUERQUE—Reiche, Parry  
Summerson, Charles H.  
ARTESIA—Craig, Erik K.  
Iversen, William G.  
Sheldon, Vilas P.  
Yates, Harvey Emmons  
CARLSBAD—Adams, John Emery  
Harley, G. Townsend  
King, Robert E.  
Riggs, George D.  
Wills, Neil H.  
CUBA—Sullwood, Harold H., Jr.  
DEMING  
Williams, George Arthur  
HOBBS—Boss, Reuel Lee  
Lamb, Noel Raymond  
Madera, Fred  
Miller, Charles Farmer  
Moore, Joe Hiram  
Scott, Wilton Elgee  
Staley, C. Glenn  
Tanner, Hugh A.  
JAL—Davis, William Kenneth  
LOVINGTON  
Roberts, Price E.  
ROSWELL—Barnett, John Abner  
Headley, Joseph B.  
Helmig, Phil D., Jr.  
Kotzya, Fred Frank  
Thurman, Franklin A.  
SANTA FE—Maxwell, Ross Allen  
Rankin, Charles H., Jr.

## SILVER CITY

Rothrock, Howard E.  
SOCORRO—Bates, Robert Latimer  
Vorbe, Georges

## NEW YORK

ALBANY—Larrabee, David M.  
Myers, Clay Kenton  
BUFFALO—Reeves, John R.  
Wells, Harris Peyton, Jr.  
CANTON—Brown, Robert Wesley  
CLINTON—Crowl, George Henry  
GLOVERSVILLE—Olsson, Axel A.  
ITHACA—Harris, Gilbert D.  
Nevin, Charles M.  
Palmer, Katherine V. W.  
Ries, Heinrich  
LARCHMONT  
Kassander, A. Richard, Jr.  
LONG ISLAND—Farish, Linn M.  
Thompson, Lester S.  
MERRICK  
Kennedy, Joseph B., Jr.  
NEW BRUNSWICK  
Hayes, Albert O.  
NEW ROCHELLE  
Hawley, Luther David  
NEW YORK  
Anderson, Richard Jasper  
Baker, Norval E.  
Baker, Raymond F.  
Baxter, John C.  
Behre, Charles H., Jr.  
Berg, Ernest L.  
Bishop, Robert Alexander  
Bleecker, Edward S.  
Brokaw, Albert D.  
Buie, Bennett Frank  
Burnett, Jerome B.  
Butterworth, E. M.  
Cobb, Margaret C.  
Condit, D. Dale  
Coryell, Horace N.  
Cotner, Victor  
Cox, Benjamin Burton  
Crum, Harry E.  
Davis, Robert J.  
Dixon, A. Faison  
Dresser, Myron A.  
Eagles, Homer M.  
Eicher, Donald B.  
Ely, Fred B.  
Estabrook, Edward L.  
Fenichell, Melvin M.  
FitzGerald, Norman D.  
Garnjost, Frederick W.  
Hamilton, Charles W.  
Haynes, Winthrop P.  
Helis, James  
Herald, Frank A.  
Hindes, E. P.  
Holman, Eugene  
Hubbard, Bela  
Jablonski, Eugene  
Jones, Anna Minkofsky  
Kalb, John L.  
Kay, Marshall  
Kerstetter, Dale David  
Kinney, Harry D.  
Knebel, G. Moses  
Kraft, Philip  
Langlois, Alice  
Leibensperger, Raymond  
Lovejoy, John M.  
McCobb, Harry W.  
McCollum, Leonard F.  
McColluch, Joseph P.  
McKee, H. Harper  
McQueen, Henry S.  
Miller, William Dana  
Misteln, M.  
Monahan, Charles Joseph  
Moulton, Gail F.  
Munoz, Robert R.  
Naramore, Chester  
Nash, Howard F.

## Newhouse, Lester

Olson, Walter S.  
Paige, Sidney  
Pakisier, Louis Charles, Jr.  
Pertusio, Serge M.  
Pogue, Joseph E.  
Pratt, Wallace E.  
Rieber, Frank  
Rogatz, Henry  
Schwennesen, Alvin T.  
Sealey, Fred C.  
Skeels, Dorr Covell  
St. Clair, Stuart  
Stebinger, Eugene  
Van Beveran, O. F.  
van der Linden, B. H.  
von Estorff, Fritz E.  
Walters, Ray P.  
Wasson, Harold J.  
Weeks, Lewis G.  
Whetsel, Raymond Victor  
White, Kessack D.  
Whiton, Herman F.  
POUGHKEEPSIE  
Rog, Chester A., Jr.  
Newshin, Aldred S., Jr.  
ROCHESTER  
Reed, Charles Merton  
ROME—Tyler, Henry Johnson  
SCARSDALE—Waring, W. W.  
SCHENECTADY  
Rhodes, Edward J.  
SCOTIA—Oliver, Richard R.  
SYRACUSE—Apfel, Earl T.  
Bartlett, Fred W.  
WELLSVILLE  
Young, Wilbur H., Jr.

## NORTH CAROLINA

ASH—Kivi, Wilho John  
CAMP DAVIS  
Walker, Edward B., III  
CHAPEL HILL  
Huddle, John Warfield  
McC Campbell, John C.

## NORTH DAKOTA

BISMARCK  
Leach, Thomas W.  
GRAND FORKS  
Laird, Wilson Morrow

## OHIO

CANAL WINCHESTER  
Baird, Chester A.  
CINCINNATI  
Caster, Kenneth E.  
Rich, John L.  
CLEVELAND  
McCloy, Walter L., Jr.  
Newell, Harlan Willard  
Robinson, J. French  
Selover, Joseph B.  
Smoots, John P.  
CLIFTON  
McCullough, A. Stafford  
COLUMBUS—Lockett, J. R.  
Ring, Dewitt T.  
Spieker, Edmund M.  
DAYTON—Neer, Carl J.  
FINDLAY  
Donnell, James C., II  
Emery, Wilson B.  
Funk, Fred J.  
Koenig, Ralph A.  
Noble, Gilbert W.  
Shade, E. Bruce  
Thomas, George Terrell  
Walter, Henry Glenn  
HAMILTON—Engel, Noel W.  
LAKEWOOD—Girdler, Tom M., Jr.  
LIMA—MacDonell, James A.  
NEWARK—Ryan, Reginald G.  
TOLEDO—Lindberg, George D.

## OKLAHOMA

ADA—Jones, Boone  
Rixleben, Bruno  
Simpson, Richard W., Jr.  
ALTUS—Nance, James Weldon  
ARDMORE—Barttram, Paul L.  
Callahan, Drury V.  
Conger, Lauren Tenney  
Edstrom, Donald Edwin  
Fill, Harold B.  
Gill, Joseph Powers  
Hannum, Connelly Edgar  
Kendall, Richard G.  
Lindner, Joseph Leicht  
Marshall, John  
Miner, Charles A., Jr.  
Neighbor, Frank  
Neustadt, Walter, Jr.  
Pickering, Warren Yale  
Rose, Stanford Leland  
Sappington, Chester  
Schweers, Frederick Paul  
Sherman, Wilbur Brown  
Tomlinson, Charles W.  
Westheimer, Jerome M.  
White, Maynard P.  
BARTLESVILLE  
Absher, William F.  
Allen, Harris Hayes  
Ambrose, A. W.  
Baldwin, Harry L., Jr.  
Barclay, Stewart  
Bradley, Richard Morris  
Charles, Homer H.  
Clark, Robert P.  
Courtier, William H.  
Dieter, Arthur E.  
Dunbar, Robert O.  
Elliott, George R.  
Graham, B. L.  
Hintze, Alma Jones  
Hoffman, Charles C.  
Isaacs, Elizabeth  
Johnson, Holger Olin  
Jones, Daniel John  
Kautz, Archie R.  
Kidd, Robert L.  
Lounsbury, D. E.  
Miller, Vincent  
Moss, Rycroft G.  
Murphy, P. C.  
Nisbet, John M.  
O'Keeffe, Hugh W.  
Olson, Walter Sigfried  
Owen, Herman J.  
Sands, J. M.  
Stirtz, W. Melvin  
Stucky, Zenas E.  
Thompson, Edwin Ivor  
Weirich, T. E.  
Wells, Murray J.  
Wilhelm, Arthur K.  
BENNY—Cumming, Alfred  
BOISE CITY  
Clark, Frank T.  
CEMENT  
Worrell, Frank Hansen  
CHANDLER  
Wagner, J. Basil  
CHICKASHA  
Adams, Robert James  
Becker, Robert More  
Becker, Theodore G.  
CORDELL—Young, Claude T.  
COWETA—Vernon, I. J.  
CUSHING—Ellison, Charles W.  
DUNCAN—Boone, Dan Eugene  
Gouin, Frank  
Montgomery, Phil C.  
Parsons, Claude P.  
Smalley, Claire F.  
DURANT—Goodman, P. W.  
EDMOND—Crockett, Harry Lee  
Miller, Harry A.

- ENID**—Clifton, R. L.  
 Ford, Carl S.  
 Lillibridge, Harry E.  
 McClain, Forrest Milton  
 McKay, Alexander Ewing  
**GUTHRIE**—Wynne, Hal C.  
**HENRYETTA**—Davis, Leon Virgil  
 Morris, Walter W.  
**HOBART**—Russom, Vaughn W.  
**JAY**—Valerius, M. M.  
**KINGFISHER**  
 Morgan, Aubrey Austin  
**KONAWA**—Jordan, J. B.  
**LAWTON**—Hinson, Hillord  
**MADILL**—Brillhart, Norman W.  
 Northrip, Gerald Albert  
**MCALISTER**—Jones, Charles T.  
**MUSKOGEE**  
 Thams, William Hoover  
 White, Kirk S.  
**NASH**—Wethington, William O.  
**NELSON**—Bryan, Frank  
**NEWKIRK**  
 Fisher, Theodore Glenn  
**NORMAN**  
 Bednar, William Carr  
 Clark, William A., Jr.  
 Cloud, Wilbur F.  
 Decker, Charles E.  
 Dott, Robert H.  
 Gould, Charles N.  
 Ham, William Eugene  
 Ireland, Hubert Andrew  
 Lalleker, Cecil G.  
 Leoblich, Alfred R., Jr.  
 Leoblich, Helen Tappan  
 Melton, Frank Armon  
 Monnett, V. Elvert  
 Oakes, Malcolm C.  
 Wadsack, George E., Jr.  
**NOWATA**—Kerr, James Lee  
**OKLEON**  
 Anderson, Oscar Samuel, Jr.  
**OKEMAH**—Luman, Edmondson D.  
**OKLAHOMA CITY**  
 Akers, Wilburn Holt  
 Alexander, Joseph Watrous  
 Bale, Hubert E.  
 Ballard, William Norval  
 Boyle, James Philip, Jr.  
 Brauchli, R. W.  
 Brown, H. Travis  
 Brown, Vergil Neal  
 Burruss, George Howard  
 Buttram, Frank  
 Camp, Richard W.  
 Carpenter, M. E.  
 Clinkscales, Albert S.  
 Coleman, Tom L.  
 Conkling, R. A.  
 Dahlgren, Elmer George  
 Davis, Clyde E.  
 Durham, James Harmon  
 Ellison, Kenneth A.  
 Evans, Robert Pierce  
 Faust, Joseph  
 Feather, Virgil G.  
 Fillmore, Ralph L.  
 Forcade, Kirk Charles  
 Frizzell, Mildred Armore  
 Gibson, George Drew  
 Glass, Theodore G.  
 Gutschick, Raymond Charles  
 Hamilton, Clarence Edgar  
 Hart, Raymond M.  
 Hicks, Ira Curtis  
 Hoke, T. C.  
 Holmes, Vernon E.  
 Hoover, F. Mabry  
 Howard, Dan O.  
 Hurry, Floyd Phillip  
 Hyatt, Don L.  
 Janovy, Frank  
 Jenkins, Harold D.  
 Jones, Roy D.  
 Keeler, Clifton M.  
 Kite, William C.  
 Latta, Lee Allen  
 Laughbaum, Graydon Howard  
 Laughlin, Roland W.  
 Lee, John E., Jr.  
 Lynn, Robert H.  
 McBee, William D., Jr.  
 McGee, D. A.  
 McIntyre, George T.  
 Miller, Willard L.  
 Montgomery, A. J.  
 Moreman, Walter L.  
 Newby, Jerry B.  
 Nichols, P. B.  
 Norville, Glen S.  
 Pasquella, George G.  
 Patterson, Luther E., Jr.  
 Perrine, Irving  
 Pollard, Robert T.  
 Ramsey, Charles E.  
 Richards, A. Howard  
 Richards, J. T.  
 Sartain, Max R.  
 Schaeffer, Hugh C.  
 Schweer, Henry F.  
 Sears, Joseph McHutchon  
 Shields, Fred C.  
 Smith, George Wendell  
 Smith, Gerald N.  
 Taylor, Charles H.  
 Turner, George Raymond  
 Van Dall, John E.  
 Wallace, P. A.  
 Woodward, George E., Jr.  
 Yoakam, Coler A.  
**OKMULGEE**  
 Cross, Margaret Tribble  
 Uri, Joseph John  
 Wise, James Sharples  
**PAULS VALLEY**  
 Hurd, Clinton O.  
**PONCA CITY**—Athy, Lawrence F.  
 Boyd, W. Baxter  
 Clark, Glenn C.  
 Clark, Stuart K.  
 Clark, W. C.  
 Ewing, Rudolph V.  
 Hunter, Robert E. Lee  
 Hurd, E. Gordon  
 Jones, Albert Lee  
 Mills, R. van A.  
 Morgan, D. M.  
 Parker, Everett C.  
 Prescott, Harold Raymond  
 Prokesh, Hugh E.  
 Royds, James Stanfield  
 Ryan, Thomas Patrick  
**PRAGUE**  
 Klabzuba, Robert Ernest  
**PURCELL**—Blanchard, W. Grant  
**SAPULPA**—MacKay, Hugh  
**SEMINOLE**—Ehlers, Allen  
 Kline, Robert Walter  
 Moore, Carl Allphin  
 Runyan, E. L.  
**SHAWNEE**  
 Baldwin, Benjamin F.  
 Bachaw, Willis Oliver  
 Brown, Robert  
 Campo, Henry Andrew  
 Carpenter, Everett  
 Cassingham, Robert L.  
 Dawson, Edwin A.  
 DeLong, James A.  
 Ditsworth, Glenn W.  
 Gahring, William Ross  
 Graham, Will Lee  
 Hoyle, Charles R.  
 Kittredge, Frank R.  
 Larson, Wilbert S., Jr.  
 Lehman, Roy P.  
 McAninch, Roy David  
 Meyer, Arthur M.  
 Muir, J. Lawrence  
 Owen, Elwyn R.  
 Quiett, Roy C.  
 Rau, Harold L.  
 Reavis, George David  
 Roberts, M. C.  
 Spangler, Grant W.  
**TULSA**—Ackers, A. L.  
 Adams, Kilburn E.  
 Albert, Emil Richard, Jr.  
 Allen, William Odus, Jr.  
 Anderson, Tom A.  
 Arnold, Henry C.  
 Arnold, Lincoln Merchant  
 Bace, A. C.  
 Ballard, James L.  
 Bartram, John G.  
 Bates, Robert Paul  
 Baum, Robert  
 Beck, Elfred  
 Becker, Dwight Lyman  
 Becker, Herman Carroll  
 Beekly, Albert L.  
 Bennett, Frank O.  
 Bernard, W. E.  
 Berwald, W. B.  
 Bevan, Thomas Judson  
 Bishop, Francis Luther  
 Bleakley, Alfred Bishop  
 Bloesch, Edward  
 Bohart, Philip H.  
 Borden, Joseph L.  
 Born, William Theodore  
 Brant, Ralph A.  
 Brice, John W.  
 Brown, Frank E.  
 Brown, Harry J.  
 Brown, Merritt H.  
 Buckstaff, Sherwood  
 Bullard, Edgar F.  
 Bush, Frederic A.  
 Butt, William Horace  
 Carlson, Charles G.  
 Carter, Roland White  
 Case, Leslie C.  
 Case, William B.  
 Chapman, Martin Edward  
 Chapman, Richard Thomas  
 Claiborne, Ray E.  
 Clark, Frank Rinker  
 Clark, Howard  
 Clark, Joseph M.  
 Clark, L. W.  
 Clarke, Ralph L.  
 Clote, Thomas Anthony  
 Coffin, R. Clare  
 Collins, Jack Beverly  
 Conhaim, Howard J.  
 Cornelius, Lee Henri  
 Coryn, F. R.  
 Crain, John Richard  
 Cullen, Ronald J.  
 Dannenberg, R. M.  
 Davis, Sidney H.  
 Denison, A. Rodger  
 Devin, Fred A.  
 Dillard, W. Reese  
 Dille, Glenn Scott  
 Drake, Cecil  
 Dunlap, George Elmer  
 Eckenwiler, Cleo W.  
 Edson, Fanny C.  
 Egan, John A.  
 Eirich, Constance G.  
 Elson, William H.  
 Emrick, D. G.  
 Evans, Noel  
 Ewbank, Norman Ware, Jr.  
 Feagin, Barney, Jr.  
 Ferguson, John L.  
 Finley, Jean Carson  
 Fitts, L. E., Jr.  
 Fitzgerald, Paul E.  
 Forsythe, Roderick James  
 Fosshage, Ernest Willard  
 Fuller, Melville Weston  
 Galbreath, Glenn G.  
 Galloway, George Harold  
 Gardner, James H.  
 Garrett, Robert E.  
 Gartner, James L.  
 Gawthrop, R. M.  
 Geyer, Robert Lee  
 Gilbert, Thomas Harold  
 Gilmour, Andrew  
 Giltinan, George Murray  
 Ginter, Roy LaMont  
 Goodrich, Harold B.  
 Graeber, Clyde P.  
 Green, William Gladstone  
 Griffith, Glenn R. V.  
 Grigsby, R. B.  
 Guiley, Vernon E.  
 Hall, Dollie Radler  
 Hamilton, Robert G.  
 Hamner, Francis Merrick  
 Harlton, Bruce H.  
 Harris, Seward F.  
 Harvey, Castle J. C.  
 Hatcher, Oscar  
 Hawkes, Wendall Homer  
 Hawkins, Allen Gentry  
 Hawkins, Glenn D.  
 Heeren, Julius Anthony  
 Henderson, Dorothy Jane  
 Henry, William Wirt  
 Hestbeck, Marion E.  
 Hewett, Charles Francis  
 Hill, Orval Hall  
 Hill, V. G.  
 Holston, Alvin Arthur  
 Hoover, James B.  
 Hopper, Walter E.  
 Horkey, William E.  
 Horner, William L.  
 Hosterman, John F.  
 Howard, W. V.  
 Howell, Jesse V.  
 Hower, S. Grace  
 Hughes, Richard  
 Hull, J. P. D.  
 Hunt, Lenora May  
 Innes, Arland I.  
 Janovy, John  
 Johnston, John C.  
 Kate, Frederick Henry  
 Kaufman, James S.  
 Kennedy, Luther E.  
 Kieck, Myron C.  
 Kimball, Kent K.  
 King, Charles C.  
 Kister, Herbert H.  
 Kleen, Harold J.  
 Knappen, Russell S.  
 Koch, Heinrich L.  
 Kravis, Raymond F.  
 Kridler, George M.  
 Kunsman, Howard Smith  
 Lambert, Gerald S.  
 Lane, Charles W.  
 Larkin, Pierce  
 Larson, Carl L., Jr.  
 Leiser, J. B.  
 Levorsen, A. I.  
 Lilienborg, Burton A.  
 Littlefield, Max S.  
 Lukert, Louis H.  
 Lund, Wesley R.  
 Maples, Steve Campbell  
 Maravich, Milan D.  
 Marble, Kennedy R.  
 Markham, Edmond O.  
 Markley, Elmer A.  
 Matson, Thomas Edwards  
 McCoy, Alex W.  
 McCoy, Joseph Hanford  
 McCarty, E. W.  
 McCulloch, James Cole  
 McEachin, Wright Daniel  
 McFarland, Earl R.  
 McGehee, J. Rex  
 McGirl, James N.  
 McIntyre, Paul J.  
 McMillen, Raymond F.  
 McMorris, William A., Jr.

Melvin, Marlowe D.  
 Merritt, John W.  
 Mershon, Milton M.  
 Miller, Buford Maxwell  
 Miller, Wendell Z.  
 Millikan, Charles V.  
 Millison, Clark  
 Monahan, Foster Murray  
 Moore, Homer Clarence  
 Moore, Horatio L.  
 Morero, Joseph E.  
 Morley, Harold T.  
 Mosburg, Lewis G.  
 Moses, Harold F.  
 Mossman, Ruel Wallace  
 Murphy, James K.  
 Murray, Albert N.  
 Neal, E. Preston  
 Nelimark, John H.  
 Neumann, L. Murray  
 Newman, Thomas F.  
 Nufer, D. C.  
 Oliphant, A. G.  
 Palmerston, Stewart C.  
 Paterson, Robert  
 Patton, Roger R.  
 Peabody, Harlan W.  
 Pecker, Don H.  
 Perry, Wayne Burton  
 Phelps, Frederick G.  
 Pierce, Harold Frederick  
 Price, James A.  
 Price, Sylvan S.  
 Probst, David Arthur  
 Probst, Karl Max  
 Rae, Colin C.  
 Rankin, Horace Ellis  
 Redfield, John S.  
 Reisher, Paul H.  
 Renfro, Harold Bell  
 Reynolds, Karl W.  
 Richards, Raymond  
 Rickard, Hilton Lloyd  
 Riggs, Robert J.  
 Roark, Edward L.  
 Roark, Louis  
 Roark, Louis Claude  
 Roark, Ralph B.  
 Rogers, Andrew J.  
 Ross, Charles M.  
 Russell, William L.  
 Rutledge, Richard B.  
 Ryniker, Charles  
 Saubert, Robert William  
 Scott, H. M.  
 Scott, Horace L.  
 Scott, Vernon C.  
 Scudder, Ernest W.  
 Seaman, L. O.  
 Sharpe, Joseph Audley  
 Shea, Edward F.  
 Sherry, William J.  
 Shutt, Roscoe E.  
 Silverman, Danis  
 Sinclair, William B.  
 Siverson, Garfield C.  
 Sloan, Raymond D.  
 Snow, Dale R.  
 Solikidy, Albert LaFayette  
 Spahr, Marshall Richard  
 Stoner, O. E.  
 Stotter, Raymond Tracy, Jr.  
 Strachan, Clyde G.  
 Stump, Mark Eugene  
 Summerford, H. Edgar  
 Tandy, J. Hiram  
 Tappolet, Werner  
 Tarr, Russell S.  
 Tarver, Earl A.  
 Taylor, Garvin L.  
 Teis, Maurice R.  
 Templeton, James B.  
 Thomsen, Erik  
 Tillotson, Allen W.  
 Travis, Abe  
 Treadwell, Mary Louise

Truex, Arthur F.  
 Tuttle, Richard Carol  
 Upp, Jerry E.  
 Vernon, Jess  
 Wagner, Carl D.  
 Wagner, Clyde L.  
 Wagoner, George E.  
 Wails, Elmer D.  
 Walker, Lucian H.  
 Walters, Robert F.  
 Wanenmacher, Joseph M.  
 Watson, Joseph D.  
 Weatherly, Benjamin B.  
 Welmer, Frank G.  
 Welch, Virgil H.  
 Wellman, Dean C.  
 Westby, Gerald H.  
 White, Luther H.  
 Wilcox, Stanley W.  
 Willis, S. Morse  
 Wilshire, L. M.  
 Wilson, James Neff  
 Wilson, Walter B.  
 Wines, Donald Bradford  
 Wood, Robert H.  
 Wood, Virgil O.  
 Woods, Sam H.  
 Woolley, William L.  
 Wright, Harry F.  
 Wyman, Everett A.  
 Younkman, Harry D.  
 Zoller, Lawrence J.  
 WAUKOMIS—Noland, Orval W.  
 WOODWARD—Bradish, Beverly B.  
 Finfrook, Lawrence J.  
 Sufield, Harry Franklin  
 YALE—Hancock, Bob  
 YUKON—Goudy, Louis Willard

## OREGON

PORTLAND—Williston, Samuel H.

## PENNSYLVANIA

BRADFORD—Cooley, Ralph S.  
 Dickey, Parke A.  
 Eckert, Frank E.  
 Fralich, Charles Eugene  
 Shoemaker, William M.  
 Simmons, Arthur Carlisle  
 Stephens, Maynard Moody  
 BRYN MAWR—Bard, Richards J.  
 Dryden, Lincoln  
 CLARION—Arnold, Harry H., Jr.  
 COOPERSTOWN—Small, Walt M.  
 COUDERSPORT  
 Cole, Alma Malone  
 Whorton, Chester D.  
 DELMONT—Zimmerman, James Z.  
 HARRISBURG—Downing, R. B.  
 Meadville  
 Stone, Solon Wallingford  
 Mr. LEBANON  
 Swain, James Fulton  
 OIL CITY  
 Montgomery, James G., Jr.  
 Secor, Donald T.  
 Seifert, Wilbur H.  
 PHILADELPHIA  
 Giles, John M.  
 Griley, Horace L.  
 Guntz, Henry Anthony  
 Harris, Richard C.  
 Lindsy, Ben E.  
 Pike, Sumner Tucker  
 Weeks, Herbert J.  
 White, Tell Thompson  
 PITTSBURGH  
 Allen, Frank Tilbury  
 Allon, Michael  
 Aszklar, Stanley J.  
 Backman, John Edward  
 Bassett, Charles F.  
 Bayles, Robert Ellery  
 Benedum, Darwin  
 Boots, Paul Heath  
 Brankstone, Hugh R.

Bristley, Leon P., Jr.  
 Busch, Daniel Adolph  
 Davis, Ralph E.  
 Eckhardt, E. A.  
 Fetteke, Charles R.  
 Finn, Fenton Harrison  
 Foster, Alden W.  
 Galey, John Taylor  
 Galpin, Sidney Stewart  
 Gealy, Wendell B.  
 Gemmell, Howard Frederick  
 Giles, Howard Windfield  
 Goodman, John V.  
 Grow, George C., Jr.  
 Gulley, M. Gordon  
 Hastings, Wynne K.  
 Heald, K. C.  
 Hopkins, Richard Holmes  
 Kerbow, Russell B.  
 Ketterer, Walter P.  
 Lang, Ralph H.  
 McGee, John Evan  
 McGrew, Harry Johnson  
 Melchior, Louis Francis  
 Melvin, John Harper  
 Meszaros, William A.  
 Nettleton, L. L.  
 Newlon, John Hawker  
 Patnode, Homer Whitman  
 Rand, Wendell P.  
 Rhoades, Ralph O.  
 Ross, Ralph B.  
 Schillhahn, E. O.  
 Sherrill, Richard E.  
 Somers, Ransom E.  
 Tolmachoff, I. P.  
 Vance, Warner R.  
 Wagon, George R.  
 Wylie, James R., Jr.  
 PORT ALLEGANY  
 Gaddess, Jack  
 PROSPECT—Shaffer, John M.  
 STATE COLLEGE  
 Krynine, Paul D.  
 McCormick, Robert L.  
 Pison, Sylvain J.  
 Swain, Frederick M.  
 STRAFFORD  
 Mahoney, Roger Sylvis  
 SWARTHEMORE—Bartle, Glenn G.

## RHODE ISLAND

NEWPORT—Geyer, Richard A.

## SOUTH CAROLINA

CHARLESTON  
 Watkins, Joe Henry  
 CHESNEE—Mullinax, Jack D.  
 SOUTH DAKOTA  
 CUSTER—Page, Lincoln R.  
 RAPID CITY—Gries, John Paul  
 Tullis, Edward L.  
 SIOUX FALLS—Lee, Herbert V.  
 VERMILION—Rothrock, E. Paul

## TENNESSEE

CHATTANOOGA  
 Dunlap, John Crawford  
 Frank, John Westlake  
 COLUMBIA—Butters, Roy M.  
 MEMPHIS—Ruwwie, John W.  
 NASHVILLE—Born, Kendall E.  
 Ferguson, Herman W.  
 Glenn, L. C.  
 Whitlatch, George I.  
 Wilson, Charles W., Jr.  
 OAK RIDGE  
 Doan, Richard Lloyd

## TEXAS

ABILENE—Anderson, Robert G.  
 Blanchard, Stanley W.  
 Byram, John Perkins  
 Deuth, Martin John  
 Hall, Ellis A.

Maxwell, Riley G.  
 Merry, Edward T.  
 Nowles, Kenneth B.  
 Perni, Vincent C., Jr.  
 Taylor, Cyril B.  
 Word, Charles F.  
 ALBANY—Stanney, Herman R.  
 ALICE  
 Davidson, John P.  
 Franks, Robert M.  
 McCammon, John Henry, Jr.  
 Rossebo, C. B.  
 Short, Richard T.  
 AMARILLO—Anderson, Carl C.  
 Armstrong, Earle N.  
 Britt, Harry Max, Jr.  
 Craig, T. C.  
 Doshier, Achille Wicks  
 Dougherty, Jack Francis  
 Gude, Leo J.  
 Hagy, Lawrence R.  
 Hemmell, Glenon C.  
 Hughes, Don  
 Melzer, Laurence S.  
 Mohler, Donald Phillips  
 Moxey, Walter G.  
 Oles, Lawrence M.  
 Paschal, Elisha A.  
 Peterson, Clarence J.  
 Panches, Richard Knapp  
 Rumsey, Edward W.  
 Rusk, Willard W.  
 Sisney, Everett Weston  
 Thompson, James D., Jr.  
 Van Tine, Arthur Benbrook  
 Wagner, Cary Richard, Jr.  
 ARLINGTON—Lynch, S. A.  
 AUSTIN—Allen, Fraser Hall  
 Beschke, Earl Jr.  
 Bullard, Fred M.  
 Bybee, Hal P.  
 Byram, Ronald W.  
 Cooke, Henry Clay  
 Corrigan, Glen Lee  
 Cuyler, Robert H.  
 Damon, H. Gordon  
 Elifur, Gus Kearney, Jr.  
 George, W. O.  
 Hauptman, Herman Ray, Jr.  
 Hendricks, Leo  
 Hirsch, Nolan  
 Hurlbut, Elvin M., Jr.  
 Lang, Joseph Winford  
 McNutt, Gordon Russell  
 Orman, Freeman L., Jr.  
 Plummer, Fred B.  
 Power, Harry H.  
 Redfield, Robert Crim  
 Sellards, E. H.  
 Snider, L. C.  
 Stenzel, Henryk B.  
 Stiles, Aden E.  
 Warren, Lincoln Edgar  
 Weeks, A. W.  
 Whitney, F. L.  
 Winkler, Hans  
 BAY CITY—Fryou, Joe A.  
 Wadsworth, Albert H., Jr.  
 BEAUMONT  
 Bartlett, C. Lothrop  
 Braugh, Donald D.  
 Claypool, C. B.  
 Cooke, William F., Jr.  
 Denton, Harold  
 Durgan, Herbert Leonard  
 Fera, Dan Edwards  
 Justice, Philip S.  
 La Touche, John D.  
 Martin, Bethea Allen  
 Maxwell, John Crawford  
 Pack, R. W.  
 Rose, Harrison W.  
 Schroeder, Kingsley V.  
 Todd, Oliver J., Jr.  
 BEEVILLE—Barnett, D. G.  
 Fletcher, Claude Osborne

- Gully, Philip D.  
Hancock, J. M.  
Miller, David M.  
Senseman, Ralph B.  
Shayes, Fred P.
- BELLVILLE**  
Batla, Thomas Woodrow  
Big Springs—Barnes, Chester F.  
Dana, Richard Harry  
**BORGER**—Ribble, John M.  
Van Sant, John S.  
**BOWIE**—Barrett, Henry H.  
**BRADY**—Olson, Odell Cecil  
**BRENNHAM**  
Allen, Charles Francis  
**BROWNSVILLE**  
Champion, Joe August  
**BROWNWOOD**  
Fisher, Dunbar A.  
**BRYAN**—Rodgers, John Albert  
**CAMERON**—Robinson, B. F.  
**CAMP HULEN**—Young, Keith P.  
**CHILDRESS**—Hussey, Keith M.  
**CISCO**—Coldwell, Charles H.  
**COLEMAN**—Cheney, M. G.  
**COLLEGE STATION**  
Turner, Francis Earl  
Vance, Harold  
**COLORADO CITY**  
Jones, Leland W.  
**CONROE**—Jones, Robert W.  
**CORPUS CHRISTI**  
Alagood, Robert Henson  
Benson, Dale L.  
Bong, Carl P.  
Buck, Cleo Eugene  
Chalupnik, Elsie B.  
Clark, James Tate  
Dahm, John N.  
Gierhart, Guy B.  
Hansell, James Myron  
Heaton, Adrian H.  
Hendrickson, Robert D.  
Herring, L. B.  
Isenberger, Nate P.  
Jolley, Durward N.  
Kelsey, Lewis O.  
Maley, Willis A.  
McCallum, Henry D.  
McClain, Orville Graves  
Miller, Carroll C.  
Owens, Frith C.  
Parish, Gaston H.  
Poole, John Clifton  
Price, W. Armstrong  
Ross, Donald Alexander  
Scrafford, John Bruce  
Seever, Harris N.  
Smith, Floyd Clayton  
Stein, Ira H.  
Swiger, Rual B.  
Symonds, Henry Gardiner  
Taegel, Edwin A.  
Travis, Joe Johnson  
Tucker, Reagan  
West, Lloyd G.  
**CRANE**—Kleeman, Albert P.  
**CROWELL**—Dickerson, Charles H.  
**DALLAS**—Agnich, Fred J.  
Albritton, Claude C., Jr.  
Alcorn, James Munreux  
Allen, E. G.  
Anderson, Carl T.  
Anderson, Frank Marion  
Aronson, Sam M.  
Autry, Vernon E.  
Bediz, Pertev I.  
Bostick, J. Wallace  
Bozbag, Hamdi Ahmet  
Brantly, John E.  
Bright, Richard T.  
Birscoe, Glenn O.  
Brooks, Olin D.  
Brown, Augustus Bart  
Burchard, Frederic L.  
Burruss, Walter M.
- Byrd, David Harold  
Carpenter, Charles B.  
Carter, Devere V.  
Cesinger, E. F.  
Clark, John W.  
Clawson, William W.  
Clifford, O. C., Jr.  
Cobb, Howard L.  
Collingwood, D. M.  
Collins, C. Philip  
Corman, Hyman  
Cortes, Henry C.  
Cortes, Henry Cornelius, Jr.  
Cox, Wesley Philip  
Crawford, David J.  
Dana, E. B.  
Davis, Roger Hugh  
DeGolyer, E.  
Doering, John  
Eckart, Robert R., Jr.  
Elliott, John E.  
English, Leon E.  
Estergren, E. F.  
Esunas, Bernard J.  
Ferguson, Marion Lee  
Fisher, Barney  
Fosdick, Arthur R.  
Foster, Paul Woodward  
Fouts, John M., Jr.  
Frost, Jack  
Garner, Aubrey H.  
Garrett, Melvin M.  
Germany, Eugene Ben  
Gillin, John A.  
Gilmore, Kathleen K.  
Graham, Gordon L.  
Grant, Drane Fones  
Gray, Alfred  
Green, Cecil H.  
Guthrie, Robert Keith  
Hagen, Cecil Vernon  
Hager, Dilworth S.  
Hamilton, Irving B.  
Hamm, W. Dow  
Hard, Edward W.  
Headington, Clare W.  
Heath, Charles E.  
Hill, Harry B.  
Hudson, William Taylor  
Joekel, Fred E.  
Jordan, Louise  
Karcher, John C.  
Kelsey, Martin C.  
Kendrick, Frank E.  
Kern, Jack Charles, Jr.  
Knox, T. K.  
Kraus, Edgar  
Lahee, Frederic H.  
Laves, U. R.  
Lewis, James A.  
Lloyd, Abe M.  
Love, Perry R.  
MacNaughton, Lewis W.  
Mayfield, Gid C.  
McCarver, Holland C.  
McDermott, Eugene  
McFarland, Paul W.  
McFarland, Russell S.  
McLeod, Angus  
Menefee, James C.  
Meredith, Carlton  
Meyer, Willis G.  
Monsour, Emil  
Moore, Gilbert Parvin  
Morgan, Henry J., Jr.  
Nash, Paul E.  
Newton, William Wilson  
Norton, George H.  
Oden, Arthur Jack  
Oldham, Albert E.  
Pernell, James Herbert  
Perryman, James Dale  
Pittman, Chalmers Van Anglen  
Powell, Ralph S.  
Ralston, Wallace  
Ransone, William Robert
- Reagor, Edward C.  
Rettger, Robert E.  
Rice, George Baker  
Rider, Charles R.  
Robie, Robert Hodges  
Robinson, Heata M.  
Rowden, Dale Henry  
Russ, Leon F.  
Russell, Philip G.  
Sale, Clarence M.  
Schultz, Frank August  
Schwarz, Melbert E.  
Slater, Kenneth C.  
Seale, Robert I.  
Sheldon, Wichita F.  
Shugart, Thomas R.  
Shuler, Ellis W.  
Simkins, J. J.  
Smith, Eugene W.  
Smith, J. Fred, Jr.  
Steir, Raymond A.  
Stevens, Nelson P.  
Storm, Alfred E.  
Tapper, Wilfred Bonno  
Taylor, Surce John  
Teas, Paul C.  
Teichman, Joseph B.  
Thompson, Sheridan A.  
Tottenham, Woodson M.  
Tucker, Robert Louis  
Tygrett, H. V.  
Vanderpool, Harold C.  
Walton, Oscar Edward  
Waters, James A.  
Whitcomb, Bruce  
White, Rex Harding  
Wilcox, Fred H.  
Williams, Charles C.  
Wilson, Eugene England  
Wilson, Joseph M.  
Wilson, Malcolm E.  
Wolf, Deane J.  
Zadik, Jacob William  
**DENTON**—Bonar, Robert E.  
Hood, Forrest W.  
Schlosser, Paul A.  
**DONNA**—Huntley, Louis G.  
**EAGLE**—Moir, John  
**EASTLAND**—Cox, Robert T.  
Perkins, Joseph M.  
**EDINBURG**—Coel, Eustace J.  
North, Lloyd  
**EL PASO**—Baldwin, E. B.  
Millard, William J.  
Nelson, Lloyd A.  
**FLOYDADA**—Davis, Lon, Jr.  
**FORT WORTH**—Abbott, John L.  
Adkisson, Albert W.  
Allen, Alton C.  
Applin, Paul L.  
Aurin, Fritz L.  
Bass, Perry R.  
Benton, Louis B.  
Berger, Walter R.  
Berger, Walter R., Jr.  
Bradfield, Herbert H.  
Bradish, Ford  
Brown, J. Earle  
Cartwright, Weldon E.  
Casteel, Sanford H.  
Christie, Robert S.  
Christner, D. D.  
Clark, G. Conrad  
Clark, H. Smith  
Cordry, C. D.  
Crandall, Roderic  
Crowley, Appleton Joseph  
Cummings, Ralph H.  
Dean, D. P.  
Dean, P. C.  
Donoghue, David  
Dudley, Raymond W.  
Fash, Ralph H.  
Fisher, Gordon H.  
Freedman, Louis H.  
Fuqua, H. B.
- Gardner, Edgar J.  
Gill, J. Willard  
Goodrich, Robert D.  
Grant, Paul A.  
Harris, Sidon  
Harvey, William W.  
Hilsweck, William Joseph  
Hudson, William A.  
Hyde, Clarence E.  
Imbt, Robert F.  
Johnston, Lois Louise  
La Neve, R. O.  
Lee, Lynn K.  
Lindeblad, Ludvig C.  
Lovejoy, J. B.  
Markley, Joseph H., Jr.  
Marshall, Frank Ellis  
Maverick, Philip  
McClure, Harold Y.  
McCune, Paul  
McGhee, George C.  
Mohr, C. L.  
Morris, James L.  
Mygdal, Karl A.  
Nicol, David  
Nolte, William J.  
Petta, Joseph B.  
Phipps, Joseph B., Jr.  
Pishny, Charles H.  
Poulsen, Frank E.  
Powers, Elliot H.  
Reeves, Frank W.  
Renaud, Charles L.  
Renfro, Millicent A.  
Romine, Thomas B.  
Sanders, C. W., Jr.  
Schempi, Foster John  
Schouten, Franklin H.  
Schweers, Richard Henry  
Scott, Gayle  
Sinx, Dorothy Helen  
Smith, Ralph E.  
Snow, Robert D.  
Stookey, Donald G.  
Thomas, J. Elmer  
Thompson, Benedict E.  
Thompson, R. R.  
Turner, Clyde Weldon  
Upson, M. E.  
Van Steenbergh, Samuel K.  
Van Zant, James H.  
Weaver, George A.  
Wheeler, Carlton Wesley  
Whisenant, J. Barney  
Wilson, John H.  
Winton, Will M.  
Yager, Charles E.
- GALVESTON**  
Zinke, Ernest Clarence  
**GENOA**—Clark, Paul H.  
**GEORGETOWN**  
Blank, Horace Richard  
**GLEN ROSE**  
Bartley, Jerald Howard  
**GOLDTHWAITE**—Ott, Emil  
**GRAHAM**—Russell, Hewlett A.  
Tims, Vergil E.  
**HAMILTON**—Stiles, Elisabeth  
**HENRIETTA**  
Harder, Banhart Pete  
**HOUSTON**—Adams, W. C.  
Adkins, W. S.  
Adler, Joseph L.  
Akkerman, Richard Pete  
Albertson, Maurice M.  
Alexander, Walter H., Jr.  
Allen, Stanley R.  
Allison, A. P.  
Andersen, Harold V.  
Anderson, George Harold  
Anderson, John G., Jr.  
Andrau, Evert Willem Karel  
Andrews, Wilton W.  
Archie, Gustave Erdman  
Back, Denys Howard  
Bader, Glenn Ernest

- Bailey, Thomas L.  
 Baker, William A., Jr.  
 Banta, Henry Eugene  
 Barber, Clifford R.  
 Barragy, Edward J.  
 Barrett, John F.  
 Barrow, Leonidas T.  
 Bauernschmidt, A. J., Jr.  
 Bayle, Pierre  
 Beatty, Robert M.  
 Beckelhymer, Roy L.  
 Beilharz, Carl F.  
 Bell, Douglas E.  
 Bell, Olin G.  
 Belt, Ben C.  
 Benish, Robert Lowell  
 Bennett, Malcolm D., Jr.  
 Benson, Don G.  
 Berg, Gilman A.  
 Best, J. Boyd  
 Black, Jo Pat  
 Blackburn, Willis C.  
 Blanchard, J. B.  
 Blau, Ludwig W.  
 Blouin, Cecil F.  
 Bocock, Oscar Lafayette  
 Bolinger, John W.  
 Booth, Robert T.  
 Born, Howard Raymond  
 Bostick, Francis Xavier  
 Bowles, R. C.  
 Bowling, Leslie  
 Bowman, Wayne F.  
 Boyles, James M.  
 Brace, Orval L.  
 Brehm, Ralph C.  
 Briard, Vernon E.  
 Bricker, John F.  
 Brinkenhoff, Ira A.  
 Brodie, Gerson Herzl  
 Brokaw, John M., Jr.  
 Broussard, David Franklin  
 Broussard, Lloyd J.  
 Broussard, Marion Ursin  
 Brown, Hart  
 Brown, Samuel B.  
 Bruyere, Alan  
 Bryan, Carl L.  
 Buchanan, George S.  
 Buck, E. O.  
 Buck, Nina M.  
 Bugbee, James McKean  
 Bunsen, Albert Washington  
 Burchfiel, Hugh Lee  
 Bush, Robert Ewell  
 Byers, John William  
 Calohan, William F.  
 Campbell, Francis F.  
 Carey, Hillard W.  
 Carlton, Dave P.  
 Carr, George W.  
 Carroll, Don L.  
 Cartwright, Lon D., Jr.  
 Casey, Sam Russell, Jr.  
 Cashin, D'Arcy M.  
 Chambers, Robert J.  
 Charrin, Paul  
 Childerhose, Allen J.  
 Christie, Laurence G.  
 Church, Charles R., Jr.  
 Clark, Clare M.  
 Clark, George H.  
 Clark, Willis Kenley  
 Clement, George M.  
 Collett, J. Daviss, Jr.  
 Collier, John J., Jr.  
 Conrad, Charles S.  
 Cox, Harris  
 Crosbie, James Morton  
 Cruse, John S., Jr.  
 Culbertson, John Archer  
 Curran, James M., Jr.  
 Darling, Jack N.  
 Davis, Donald M.  
 Davis, Flavy Eugene  
 Davis, Morgan J.  
 Dawson, Robert John  
 Day, Willard L.  
 Decker, LaVerne  
 DeLancey, Charles J.  
 Deussen, Alexander  
 Dissinger, Earl  
 Doherty, Wilfred Thomas  
 Dorr, James B.  
 Durkee, Robert R.  
 Earl, Eugene Leonard  
 Eby, J. Brian  
 Edison, Dwight J.  
 Ellis, Albert D., Jr.  
 Ellisor, Alva C.  
 Esgen, W. K.  
 Fenn, Ivan J.  
 Ferguson, Fred Travis  
 Ferguson, Hershal D.  
 Ferguson, Jack B.  
 Ferguson, Kenneth H.  
 Ferguson, William B.  
 Ferrando, Aldo  
 Flowers, Jackson J.  
 Fly, Paul J.  
 Fohs, F. Julius  
 Franklin, Louis  
 Fritts, Harold M.  
 Frost, Jay Miles, III  
 Fulk, Frank Floyd  
 Fuqua, Marjorie C.  
 Galhagan, Donald I.  
 Galbraith, Thomas J.  
 Gale, Arthur Sullivan, Jr.  
 Galloway, Alan James  
 Gardescu, Ionel I.  
 Garrett, Julius B., Jr.  
 Garst, Jarvis  
 Getzenderan, A. E.  
 Gibbs, James F.  
 Golden, John Muro  
 Goldston, Walter L., Jr.  
 Goldstone, Frank  
 Gollnick, Robert Louis  
 Goodrich, Paul K.  
 Goodrich, Raymond H.  
 Gordon, Dugald  
 Gorman, William Albert  
 Granberry, Raymond James  
 Gray, Shapleigh G.  
 Gray, William D.  
 Griffin, Irving M., Jr.  
 Grinsfelder, Sam  
 Grogan, Samuel A.  
 Grosjean, Robert  
 Grossman, William Lewis  
 Guyod, Hubert  
 Haase, Fred M.  
 Hafner, W.  
 Hager, Lee  
 Halbouty, Michel Thomas  
 Hall, Thomas Ola  
 Halsted, Morris E.  
 Hamilton, Edward A.  
 Hamman, John, Jr.  
 Hamner, Edward John  
 Hancock, William T., Jr.  
 Hanna, Marcus A.  
 Hansard, Charles O., Jr.  
 Hansen, Malcolm B.  
 Harding, Robert Nelson  
 Hardison, Harvey  
 Harkins, Thurman I.  
 Harrington, George Haymond  
 Hasselmann, Karl F.  
 Hedley, J. David  
 Hensch, Carl Russell  
 Henderson, Marion Reece  
 Hennen, Ray V.  
 Herold, C. Lathrop  
 Higgs, Morton T.  
 Hoard, J. O.  
 Hodder, Roland F.  
 Holland, Mary Loreen  
 Holliday, Samuel  
 Hopf, Robert William  
 Hornberger, Joseph, Jr.  
 Horvitz, Leo  
 Housh, C. N.  
 Hoyt, William V.  
 Huffmyer, Jack Roach  
 Hughes, Darrell S.  
 Hunter, Paul B.  
 Hutchins, Robert M., Jr.  
 Hutchinson, Frederick M.  
 Igau, Hubert C.  
 Ikins, William Clyde  
 Israelsky, Merle C.  
 Ivy, John Smith  
 Jackson, Ralph Semmes  
 Jay, Stanley E.  
 Jennings, Philip H.  
 Jenny, W. P.  
 Jett, James Everett  
 Jones, Park J.  
 Jones, Robert L.  
 Jones, Wayne V.  
 Judson, Sidney A.  
 Keller, Ray F.  
 Kemp, Harold S.  
 Kerlin, Marcus L.  
 Kidd, Gentry  
 Kirkendall, James Stuart  
 Kislung, James W., Jr.  
 Konkil, Philip M.  
 Kornfeld, Moses Marion  
 Kornfeld, Sam  
 Kovac, M. Stephen  
 Krum, William M.  
 Ladner, Albert Leo  
 Lake, Charles L.  
 Lake, James L.  
 Langford, Othell F.  
 Langton, Claude M.  
 LaRue, James E.  
 LaRue, Wilton W.  
 Lasky, Bernard H.  
 Lay, Roy L.  
 Leavenworth, Paul B.  
 Leavitt, William B.  
 Leonardon, E. G.  
 Levy, David Jacob  
 Lewis, James O.  
 Lewis, Paul S.  
 Lewis, Ray C.  
 Lewis, Wendell L.  
 Lott, Alfred Walker  
 Lowman, Shepard W.  
 Lozo, Francis Edgar, Jr.  
 Lucky, M. C.  
 Lyons, Richard T.  
 Madera, Ruford F.  
 Malkin, Doris S.  
 Manger, G. Edward  
 Marr, John D.  
 Martin, B. G.  
 Martin, Benjamin H.  
 Martin, John Charles, Jr.  
 Martyn, Phillip F.  
 Mason, Shirley L.  
 Mathes, Donald E.  
 Mathieu, Jean Leon  
 McCarter, W. Blair  
 McDonnold, Haydon W.  
 McFadden, William A., Jr.  
 McFerron, George I.  
 McGowan, F. H.  
 McLellan, Hiram J.  
 Meyers, Percy A.  
 Michaux, Frank W., Jr.  
 Miller, Buford  
 Miller, Forrest J.  
 Miller, John C.  
 Milton, William B., Jr.  
 Ming, Raymond E.  
 Minor, H. E.  
 Mitchell, George D., Jr.  
 Mitchell, Robert B.  
 Montgomery, James Campbell  
 Moore, William Bishop  
 Moore, William Willard, Jr.  
 Moresi, Cyril K.  
 Morgan, John Man  
 Morris, A. Ferd  
 Morris, Louis H.  
 Morrison, T. E.  
 Morse, Roy R.  
 Mosher, William Nelson  
 Mower, Lowell K.  
 Mueller, Frederick W.  
 Murdoch, Ernest John  
 Myers, John C.  
 Myers, Julian Q.  
 Nance, Albert G.  
 Neill, Wenzel Baker  
 Nelson, Floyd A.  
 Neuman, Leonard J.  
 Nichols, Ralph Gregory  
 Noble, Homer A.  
 O'Bannon, Prentice H.  
 O'Donnell, Lawrence  
 Ogg, Thomas A.  
 Olcott, David Perry  
 Orynski, Leonard W.  
 Osterhoudt, Walter J.  
 Owen, Kenneth Dale  
 Parker, William G.  
 Patrick, Walden W.  
 Patterson, Archibald B.  
 Pawley, Julian K.  
 Paxson, Roland B.  
 Peacock, Henry Bates  
 Percy, Charles Stuart  
 Pike, William S., Jr.  
 Pollard, Jack C.  
 Potter, Nelson B.  
 Powless, R. C.  
 Pyeatt, Lloyd M.  
 Rabensburg, Aubrey H.  
 Ray, Robert Hillier  
 Reasoner, Melton A.  
 Reed, Edwin M.  
 Reedy, Milton Frank, Jr.  
 Reiter, Wilhelm A.  
 Remick, David B.  
 Reynolds, Frank Fisher  
 Richardson, Carl B.  
 Riddle, James Irvin, Jr.  
 Ries, Minette  
 Roberts, Louis C., Jr.  
 Robertson, Parker A.  
 Robinson, Ernest Guy  
 Rolshausen, F. W.  
 Roper, Frank C.  
 Rosaire, E. E.  
 Rose, Nicholas A.  
 Rosenkrans, Robert R.  
 Ross, E. McIver, Jr.  
 Rowe, Ural A.  
 Runion, Felix Anthony  
 Russell, C. A.  
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 Sasse, Jerome B.  
 Saville, Wilson G.  
 Sawtelle, George  
 Say, Stanley R.  
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 Selig, A. L.  
 Seren, Gordon Wilbur  
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 Sherar, Stuart  
 Siegel, Frank  
 Smiser, Jerome S.  
 Smith, Arthur E.  
 Smith, Aylwin L.  
 Smith, Erwin W.  
 Smith, Fred E.  
 Smith, Fred Lewis, Jr.  
 Smith, Gerald J.  
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 Sorenson, Ira LeRoy

- Spoor, Harry C., Jr.  
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 St. Germain, R. J.  
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 Stangel, Frank J.  
 Steig, Maynard H.  
 Stephenson, Elizabeth E.  
 Stephenson, Morton B.  
 Stevens, George D.  
 Stewart, Charles H.  
 Still, John T.  
 Stoddard, Gail Hyatt  
 Stone, George Bailey  
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 Sundt, O. F.  
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 Tamborello, Anthony Joseph  
 Tash, George E.  
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 Teague, James Udell  
 Teas, L. P.  
 Teten, Robert Paul  
 Thomas, James W.  
 Thompson, Evan G.  
 Thompson, John P.  
 Thompson, Wallace C.  
 Todd, John David  
 Torrey, Paul D.  
 Troxell, John N.  
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 Van Eaton, Raymond Andrew  
 Van Melle, Francois A.  
 van Weelden, A.  
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 Daly, John Warlaumont  
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 Evans, David Morgan  
 Gibson, Donald Thomas  
 Klaus, Hellmut  
 Latch, Leonard  
 Lyle, William E., Jr.  
 Patton, Leroy T.  
 Robinson, Wilbur Irving  
 Sidwell, Raymond  
 Stainbrook, Merrill A.  
 Van Aken, Harrison  
 Von Osinski, William  
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 Hammonds, George S.  
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 Monk, John Calhoun  
 Nichols, C. R.  
 Robinson, Cecil D.  
 Russo, Martin  
 Smith, Lee Cherry  
 Warner, J. Laird  
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 Armstrong, J. M.  
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 Bailey, Willard F.  
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 Barnhart, Carl F.  
 Barton, Jack M.  
 Bayer, H. M.  
 Beckmann, Harry LeRoy  
 Bingman, Neal J.  
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 Brock, Lawrence E., Jr.  
 Brock, Stephen W., Jr.  
 Brown, Prentice F.  
 Bucher, John Eric  
 Butcher, Cary P.  
 Canon, Joe  
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 Chase, Carlos Louis  
 Clarke, Robert L.  
 Coil, Fay  
 Cole, Charles Taylor  
 Conkling, William Henry  
 Crawford, Gayle P.  
 Crays, Glenn Edward  
 Crump, John R.  
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 Dickey, Robert I.  
 Donnelly, Alden Stuart  
 Dougherty, William E.  
 Ely, George Norman  
 Ferrell, Jane  
 Fitting, Ralph U., Jr.  
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 Fritz, William Clayton  
 Funk, Marlon H.  
 Funkhouser, E. M.  
 Gaenslen, George  
 Gaffney, John Edward  
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 Giesey, S. C.  
 Gile, Richard E.  
 Glass, Wilson Vernon  
 Green, Charles C., Jr.  
 Griswold, Edward H.  
 Haigh, Berte R.  
 Halbouty, James J.  
 Harper, Oliver C.  
 Hartwell, Merland T.  
 Hedrick, O. F.  
 Hemphill, Herbert A.  
 Henderson, Charles F.  
 Henderson, William David  
 Herd, John Harvey  
 Herold, John S.  
 Heroy, William B., Jr.  
 Hill, John Junior  
 Hills, John Moore  
 Hitchcock, Edmund S.  
 Hollingsworth, Richard V.  
 Hoover, William B.  
 Hord, John Alan  
 Hyde, Ben Cooper  
 Irwin, Wallace W.  
 Johnson, Elton D.  
 Kelly, John S.  
 Kinkel, W. C.  
 Koch, Thomas W.  
 Kolm, Paul H.  
 Kribbs, George R.  
 Larsh, Napoleon B.  
 LeBlond, Robert E.  
 Leeper, Alan Bertrand  
 Lees, Laurence F.  
 Lewis, Frank E.  
 Lindeblad, E. E.  
 Lloyd, E. Russell  
 Loskamp, Alvin P.  
 Maley, Vaughn C.  
 McCarver, Alfred G.  
 McCullough, Edward A.  
 McGuigan, Francis H.  
 McKinsey, Mark Howard  
 Miller, Milward  
 Mills, Lloyd Clarence  
 Mills, Ruben C., Jr.  
 Moore, Joe Laurence  
 Moore, John I.  
 Moore, Lee Wayne  
 Moore, Prentiss D.  
 Newfarmer, Leo Ray  
 Oles, Paul S.  
 Osborne, William M.  
 Osborne, Paul F.  
 Park, Lee Brown  
 Parker, Thomas Reilly  
 Penn, William Y.  
 Pilcher, Ben L.  
 Porterfield, Robert R.  
 Putnam, George D.  
 Rankin, Robert Estes  
 Ray, Bernard A.  
 Reed, Edward Looman, Jr.  
 Reigle, Edward E.  
 Renfro, Charles A.  
 Repecka, Albert Lee  
 Rhodes, Mary Louise  
 Roberts, Gerald C.  
 Rogers, Victor William  
 Sanford, Wendell Glenn  
 Schneider, William T.  
 Scrogin, John Mills  
 Secor, Dana M.  
 Senning, Robert Conrad  
 Shaw, Charles Anderson  
 Sisson, Harry Hensell  
 Spencer, Maria  
 Stall, Trovall Lafayette  
 Steinberger, Clark R.  
 Thomas, Leonard C.  
 Vanderpool, Eugene Ward  
 Veeder, John A.  
 Vertrees, Charles D.  
 Wahlstrom, Edwin A.  
 Waldschmidt, W. A.  
 Wallace, Louis Stacy  
 Warren, John Edwin  
 West, William Ward  
 Westmoreland, Earl  
 Wheeler, Robert R.  
 Williams, Meryl Dedrick  
 Winter, Niles B.  
 Woods, E. Hazen  
 Wright, Fred S.  
 Young, Addison  
**MISSION—Daniel, Guy S.**  
 Kallina, Frank Cyril  
 Langham, Noel Thomas  
**MONT BELVIEU**  
 Chun, Harold August  
**MONTGOMERY**  
 Jackson, James Roy, Jr.  
**MT. PLEASANT**  
 Fowler, Henry Florey  
**NAVASOTA—Wolf, George H.**  
 Yarbrough, Hunter, Jr.  
**NEWGULF—Judson, Wilbur**  
**ODESSA—Larson, Philip D.**  
**OLNEY—Craig, William H.**  
 Hayes, Reese L.  
**ORANGE—Cardwell, William H.**  
**OVERTON—Roberts, Charles, Jr.**  
**PALACIOS—Barnett, John F., Jr.**  
**PALESTINE**  
 McCoy, George Young  
 McReynolds, Gregg F.  
**PAMPA**  
 Bowsher, Arthur Leroy  
 Ougley, James Alonzo  
 Rogers, Jesse Armstead  
 Schwartz, Harold Edward  
**PEARSALL**  
 Fountain, Henry Coleman  
**PECOS—Samuel, John Howard**  
**PILOT POINT**  
 Elliott, Andrew C.  
**PLANO**  
 Chaddick, William M., Jr.  
 Riesel—Frazell, William D.  
**RIVERSIDE—Weinzierl, John F.**  
**ROCKDALE**  
 Wilson, James Ernest, Jr.  
**ROSENBERG**  
 Ustynik, Edwin Frank  
**SAN ANGELO—Cannon, R. L.**  
 Clarkson, William G., Jr.  
 Cottingham, Virgil E.  
 Covington, Jerry  
 Dodson, Floyd C.  
 Emch, John W.  
 Gregory, J. N.  
 Hagan, Arthur M.  
 Morgan, George D.  
 Ray, W. C.  
 Simpson, Roscoe M.  
**SAN ANTONIO**  
 Absher, Kenneth B.  
 Alcorn, Avery Hunt  
 Banks, Thomas R.  
 Bivens, Wilmer E., Jr.  
 Boehms, Eugene Field  
 Boyer, Will W.  
 Boyle, Walter J.  
 Cannan, Morris  
 Camp, John F., Jr.  
 Campbell, William Robert  
 Chapell, Donald Owen  
 Closuit, E. M.  
 Coates, George H.  
 Colton, Howard Franklin  
 Cooper, Herschel H.  
 Corning, Leavitt, Jr.  
 Daubert, Charles A.  
 Davis, Field M.  
 Davis, Thornton  
 Dawson, Joseph M.  
 Deputy, P. R.  
 Derden, J. H.  
 Dinsmoor, Carlton G.  
 Douglas, L. A.  
 Dove, Adolph  
 Durward, Robert H.  
 Elms, Morris Allen  
 Eysell, Alfred R.  
 Forney, Maurice Edgar  
 Gilbert, A. C., Jr.  
 Gish, Wesley G.  
 Green, Guy E.

Gross, Arthur B.  
Hammond, Weldon W.  
Haring, Louis H., Jr.  
Harrell, Marshall A.  
Hemmi, Carl Wilburn  
Henderson, H. H.  
Hendson, Harold D.  
Hervey, Oney S.  
Hostetter, Harry R.  
Howeth, Irving K.  
Hunzicker, Vernon J.  
Johnson, Edward L.  
Kearny, Clinton Charles  
Kelley, Ward W.  
Kennedy, Gilbert R.  
Keppler, Leo G.  
Knicker, Hedwig T.  
Kolm, Robert N.  
Lawton, Joe  
Lester, Howard H.  
Ley, Henry A.  
Lindsay, Sidney Afton  
Lueth, Clinton A.  
Magalis, Cyrus West  
Mann, Robert Scott  
Manthos, Atlee G.  
Masterson, Reba B.  
Matson, Martin  
Mayfield, William I.  
McAdams, Ronald Earl  
McDonald, Worth W.  
Mebane, Robert Duff  
Menger, Hubert Emil  
Miller, E. Floyd  
Moore, Marion Jefferson  
Morey, Philip Stockton  
Morgan, Robert Edward  
Mossom, Stuart  
Nelson, James C.  
Nelson, Jean O.  
Nessly, Howard E.  
Netick, Joe  
Nicholls, William M.  
Owen, Edgar W.  
Palmer, Leland L.  
Patton, John Barratt  
Petrick, Glen  
Petch, Arthur H.  
Petty, Dabney E.  
Petty, Olive Scott  
Petty, Van A., Jr.  
Picklesimer, Harold G.  
Pingley, George R.  
Porch, Edwin L., Jr.  
Potter, Grover C.  
Preece, Rae  
Ratliff, Guy Marvin  
Renick, B. Coleman  
Rife, Byron  
Roberts, Homer Eugene  
Rogers, James K.  
Ross, John C.  
Row, Charles H.  
Rudolph, Paul Jackson  
Sandidge, John R.  
Sandifer, Donald F.  
Schofield, R. F.  
Scott, Arvin Forrest  
Semmes, Douglas R.  
Shaw, Silas Frederick  
Sheldon, Israel R.  
Shelton, George H.  
Sloss, James Parker  
Snider, L. B.  
Snow, Arthur Leland  
Spice, William H., Jr.  
Storm, Willis  
Teel, Dick  
Tobin, Don Freeman  
Trenchard, John  
Wagner, Charles H.  
Walker, Jule Hargis  
Ward, J. H. E.  
Warner, Ralph E.  
Webb, James A.

Whitaker, Harvey  
Williamson, Harry  
Winfrey, Donald B.  
Wiringa, Leon Otis  
Witherspoon, Edgar  
SAN AUGUSTINE  
Scott, Edward W.  
SEMINOLE—Clark, Lanham T.  
Stones, James Eugene  
SEYMOUR  
Kemp, Augusta Hasslock  
SINTON—Dake, Helen E.  
Fippes, E. L.  
Tatum, James L.  
SOURLAKE  
Germond, Kenneth Work  
TAYLOR—Grimes, Russell W.  
TEXARKANA  
McDowell, Alfred Norman  
Nuckolls, William C.  
Valerius, Claude N.  
THREE RIVERS  
Dexter, Laurence N.  
THURCKMORTON—Clowe, Charles  
TYLER—Adams, Frank C.  
Alexander, C. I.  
Allen, Bryant W.  
Barling, Robert  
Bierman, Alfred C.  
Branson, Delmar O.  
Bunn, John R.  
Burford, Selwyn O.  
Burnett, T. J.  
Burton, George E.  
Buskirk, Gordon Towers  
Cardwell, D. Harold  
Cash, Thornton C.  
Denton, Frank Roy  
Dockery, Willard Lyle  
Farmer, Russell  
Guinn, Delmar R.  
Harden, Lynn L.  
Howard, Edward L.  
Hudnall, James S.  
Loetterle, Gerald John  
Matheny, H. Claire  
McGuirt, James H.  
Meholin, Graydon L.  
Moore, Barton W.  
Murphy, Boyd Ferguson  
Pirtle, George W.  
Rauch, Wayne C.  
Self, Seldon R.  
Shelby, Thomas H., Jr.  
Stein, Francis B.  
Thomas, William T.  
Totten, Robert Briggs  
Trowbridge, Raymond M.  
Wendlandt, Edward A.  
Wilson, Edward B.  
Wright, Andrew C.  
Youngmeyer, Ray  
VICTORIA  
Johnston, Leslie Alexander  
WACO—Pool, Frank Morrow  
WALLIS—Belt, Walter Edwin, Jr.  
WEATHERFORD  
Smith, John Peter  
WESLACO  
Christner, Harold R.  
WICHITA FALLS—Bean, Ward C.  
Birk, Ralph A.  
Bowen, James P.  
Broedel, Carl H.  
Canfield, Charles R.  
Cunningham, Carleton J.  
Daniel, Orion A.  
Davies, Jack W.  
Davies, James Dudley  
Davis, John Roland  
Dimock, George Wagner  
Drake, Robert Tucker  
Fonville, Herman A.  
Fowler, William James  
Gibson, Worth C., Jr.

Giddings, Harward  
Gram, Oscar Ebsen  
Gray, Donald Arthur  
Hardison, George P.  
Haseltine, William L.  
Heninger, Dan D.  
Huff, Jack Newton  
Kay, John A.  
Kelly, Donald  
Langford, David Kemp  
Mankin, Warren Ward  
Martin, P. M.  
Maucini, Joseph J.  
McCoy, James Roy  
McGaha, Charles P.  
McKinlay, Ralph Howard  
Moorhead, Johnny Bob  
Mort, Frank Paulsen  
Mower, Loren E.  
Pettigrew, Virgil  
Petty, T. F.  
Richards, David Taylor  
Roth, Robert  
Russell, J. J., Jr.  
School, Guy J.  
Seitz, J. R.  
Shirk, Wilmer Ray  
Smiley, H. F.  
Snebold, William F.  
Stille, Earl M.  
Waggoner, Stephen G.  
Wolverton, Harold A.  
YORKTOWN—Johnson, Walter  
McMillan, Joseph M., Jr.

## UTAH

EUREKA—Lovering, T. S.  
LOGAN, Williams, J. Stewart  
SALT LAKE CITY  
Bowen, Charles F.  
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Whittier, William H.

## VIRGINIA

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Porter, Phil  
AMELIA—Sterrett, Douglas B.  
ARLINGTON  
Couser, Charles Wendell  
Johnson, Edward W.  
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Sherbondy, William Everett  
Sorrells, Warren D.  
BLACKSBURG—Holden, Roy J.  
CHARLOTTESVILLE  
Cederstrom, Dagfin John  
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Joujon-Roche, Jean Edward  
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SPOKANE—Sohn, Israel G.

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Rager, David B.  
Tucker, Rietz C.  
PARKERSBURG  
Lilligren, Jonathan M.  
Rogers, Reginald D., Jr.  
Rueley, Eugene Evan  
WHEELING—Hubman, Ralph G.  
Spaulding, Bernard B.

## WISCONSIN

DE PERE—Wenberg, Edwin Hugo  
MADISON—Brossard, Eugene E.  
Frederickson, E. A.  
Pyre, Augustin  
Twenhofel, W. H.  
MILWAUKEE  
Mastier, Arthur J., Jr.  
OSCEOLA  
Corey, George Simpson

## WYOMING

CASPER—Barrett, Albert F.  
Crawford, James Gilmore  
Cullen, Albert William  
Dilger, Raymond Joseph  
Gaul, George Howard  
Hares, C. J.  
Hiestand, Thomas C.  
Hoenshell, David T.  
Hubley, Myron D.  
Krampert, E. W.  
Larsen, Raymond M.  
Mallory, Robert W.  
McCabe, William S.  
McCanne, Roland W.  
Mitchell, Robert O.  
Purcell, Paul E. M.  
Reinhart, Philip W.  
Schoonmaker, George R.  
Schwabrow, John R.  
Sielaft, Robert L.  
Thomsen, Harry L.  
Walton, Paul Talmage  
Wood, George R.  
CODY—Cox, Thomas S.  
EVANSTON  
Bradbury, Albert Edward  
LABARGE  
Minton, Robert Joseph  
LANDER—Engleman, Rolf  
Robbins, Luther S.  
LARAMIE—Beckwith, R. H.  
Espach, Ralph H.  
Knight, Wilbur Hall  
Love, John David  
Sharkey, Henry Howe Robbins  
Thomas, Horace D.  
Thompson, Raymond M.  
Zapp, Alfred Dexter  
LOVELL—Neely, Joseph  
ROCK SPRINGS  
Fidlar, Marion Moore  
Nightingale, W. T.  
Skeeters, Warren Ware  
SHERIDAN—Davis, John Harvey  
TORRINGTON  
Robbins, Harold Weston  
WORKLAND—Ries, Edward R.

## OUTSIDE UNITED STATES

## ALBERTA

CALGARY—Acheson, Cyrus H.  
Augenthaler, Robert L.  
Beach, Hugh Hamilton  
Chilton, James Ryder  
Clark, Leslie M.  
Corbett, Clifton S.  
Farnio, Alfred W.  
Fath, A. E.  
Feldmeyer, Arthur E.  
Fournier, Frank L.  
Furnival, George M.  
Galloway, John O.  
Gray, John Gardiner  
Hancock, Willis P.  
Hoover, Malvern E.  
Howells, William C.  
Hunt, Edwin H.  
Hunter, Harry M.  
Irwin, J. S.  
Johnson, Russell V.  
Keevil, Alan Richard  
Kirby, James M.  
Link, Theodore A.  
Lockwood, Robinson P.  
Nichols, Norval W.  
Perry, Bernard James  
Rea, Henry Carter  
Sanderson, James O. G.  
Slipper, S. E.  
Spratt, Joseph G.  
Tovell, Walter Massey  
Weir, James Donald  
Williams, Thomas B.  
EDMONTON—Allan, John A.  
Desjardins, Louis H.  
Foley, Edward J.  
Gibson, Howard A.  
Huff, Keith Frederick  
Mackenzie, William D. C.  
McKinnon, Frederick Allan  
FT. MCMURRAY  
Falconer, Wilbert Lawrence  
TILLIE STATION—Gleddie, Joseph  
TURNER VALLEY—Gallup, W. B.

## ANGOLA

LOANDA—Roschen, Ernest C. H.

## ARGENTINA

BUENOS AIRES  
Braccacini, Osvaldo I.  
Breitenstein, Robert S.  
Cook, Carroll E.  
Dessanti, Rual N.  
Ducloux, Abel Herrero  
Fields, Harry B.  
Kundig, Ernst  
Leidhold, Clemens  
Martin, Rodolfo  
Reed, Lyman C.  
Rozlosnik, Andres  
Severson, George A.  
Tarragona, Jose  
CRUBUT—Catinari, Altavino E.  
LA PLATA  
Fossa-Mancini, Enrico  
Suro, Tomas  
MENDOZA—Feruglio, Egidio S.  
SALTA—Livingston, Noyes B.  
Zunino, Juan Jose

## AUSTRALIA

ASHTON PRAIRIE  
Mott, William Dick  
BRISBANE—Morgan, D. E.  
Richards, Henry Caselli  
Wade, Arthur  
MELBOURNE  
Greenham, Roy Leonard  
Rudd, Eric A.  
Woolnough, Walter George  
PERTH—Moss, Frank A.

SYDNEY—Carey, S. Warren  
Stanley, G. A. V.

## BARBADOS

BRIDGETOWN—Senn, Alfred

## BELGIAN CONGO

COSTERMANSVILLE  
Touwaide, Marcel E.

## BOLIVIA

LA PAZ—Ekholm, Victor E.

## BRAZIL

BAHIA—Pack, Oran L.  
RIO DE JANEIRO  
Shearer, Harold K.

## BRITISH COLUMBIA

KELOWNA  
McNaughton, Duncan A.

## BRITISH GUIANA

GEORGETOWN  
Guimond, Stanislaw de Kostka

## CHILE

MAGELLANES—Wise, Henry F.  
PUNTA ARENAS  
Morris, Lawrence Kendall  
Ruby, Glen M.  
Shaw, Everett S.  
Simian G., Eduardo  
Thoms, Harold Wayne

## CHINA

CHUNGKING—Sun, Chien-Chu

## COLOMBIA

BARRANCA-BERMEJA  
Muholland, Malcolm M.  
Sheldon, Robert Arnold  
BARRANQUILLA  
Chappell, Walter M.  
Cody, Marian Coffman  
Colley, Bernard Belden  
Durham, John Wyatt  
Escallon, Marion R. de  
Garwood, Roland  
Silva, Will

## BOGOTA

Acosta-Sarmiento, Gonzalo  
Aitkin, William Ernest  
Alvarado, Benjamin  
Andrews, Philip  
Barrow, Geoffrey  
Bower, John O.  
Butler, John Weston, Jr.  
Dykstra, Bouwe  
Etherington, Thomas J.  
Fichter, Hans Jakob K.  
Graves, Allan Dexter  
Guerrero, Alberto L.  
Haanstra, Ulo  
Hainfield, Willis Charles  
Henry, Schuyler B.  
Lamon, Robert S.  
McArthur, Donald  
Merritt, Roy W.  
Milley, Roy Allen  
Miller, John Bode  
Miller, Robert P.  
Perko, Albert Richard  
Ramsden, Charles Hugo  
Rigg, Robert Mader  
Saville, Charles William  
Singewald, Quentin D.  
Stanton, Edward C., Jr.  
Tong, James A.  
Trumpy, Daniel  
Whipple, G. Leslie  
Winkler, Bruno Oscar

CUCUTA  
Bowler, James William  
Schoonover, Jack Gardner  
EL CENTRO  
Dallmus, Karl F.  
MEDELLIN  
Botero-Arango, Gerardo  
VILLAVICENCIO  
MacGregor, James D.

## COSTA RICA

SAN JOSE  
Phillippi, William H., Jr.

## CUBA

HAVANA—Bermudez, Pedro J.  
Dohm, Christian F.  
Gravell, Donald W.  
Grimsdale, Thomas F.  
Gwinn, James William  
Link, Walter K.  
Palmer, Robert H.  
Wallis, William E.

## DOMINICAN REPUBLIC

CIUDAD TRUJILLO—Beall, Robert  
Hunter, James W.  
Lewis, J. Whitney  
Major, Millard Holland

## ECUADOR

GUAYAQUIL—Ayers, Floyd M.  
Beuck, William Frederick  
Durham, Charles Albert  
Gallagher, John Patrick  
Marks, Jay Glenn  
Peterson, John Jean  
Putlitz, Fritz Helmuth  
Smith, Lorne Alexander  
Thalmann, Hans E.  
Wofford, Henry R., Jr.  
QUITO—Findlay, Willard A.  
Goldschmid, Karl Theodor  
Nygren, Walter Eric  
Parsons, Harold Ewing  
Tschopp, Herman I.

## EGYPT

CAIRO  
Barker, Maurice Hubert S.  
Haight, Harold W.  
Lytel, Harvey M.

## ENGLAND

EAST RETFORD  
Lovely, Herbert Richard  
KINGSTON  
Hutchison, Arthur G.  
LONDON—Howard, Arthur Henry  
Illing, Vincent Charles  
Lees, George M.  
Lepper, G. W.  
Leyds, Louis W.  
Templeton, James Clark  
Thompson, A. Beeby  
MAIDENHEAD  
Scott, Edwin Cooper  
OXSHOTT—Hunter, Campbell M.  
TEDDINGTON  
Dozy, Jean Jacques  
Hemmings, H.  
Taverne, N. J. M.

## GERMANY

BERLIN—Stille, Hans

## HAITI

PORT-AU-PRINCE  
Kirk, Howard M.  
Postle, Gordon Leo

## INDIA

BOMBAY  
Daniel, Edgar James

LAHORE  
Lehner, Ernest J.

## IRAN

TEHERAN  
Karubian, Ruhollah Y.

## IRAQ

KIRKUK—Henson, F. R. S.

## JAPAN

TOKYO—Uwatoko, Kunio

## JAVA

BATAVIA  
Brouwer, L. E. J.

## MEXICO

MEXICO CITY  
Alvarez, Manuel, Jr.  
Arellano, A. R. V.  
Burbridge, C. E., Jr.  
Garfias, Valentine R.  
Kane, William G.  
Ordonez, Ezequiel  
Storm, Lynn W.  
Waering, Erik Norman  
Wilson, Ivan F.  
Yzaquiere, Lauro Antonio

## MONTERREY

Martinez, Fidel C.  
Vazquez, Andres Lopez  
SAN IGNACIO—Fish, Leroy  
SONORA  
Dodge, Theodore Ayrault  
TACUBAYA—Mullerried, F. K.  
TAMICO—McCluer, R. D.

## NETHERLANDS

THE HAGUE—van Gogh, F. A. A.

## NEW BRUNSWICK

FREDERICTON  
Wright, William Josiah  
MONCTON—Hole, Herbert Wray

## NEW ZEALAND

AUCKLAND—Bossard, Leon  
Collins, Burton Wallace  
GISBORNE—Barnwell, George F.  
Dorreen, James Moore  
WELLINGTON—Ongley, Montague

## NICARAGUA

MANAGUA  
Faggetter-Auer, Willem A.  
Flagler, C. W.

## NOVA SCOTIA

ANTIGONISH  
MacNeil, Donald J.

## ONTARIO

OTTAWA—Hage, Conrad O.  
Hume, George S.  
TORONTO—Berwick, James D.  
Godefroy, Constant  
Hopkins, Oliver B.  
Wheeler, Orby Clinton

## PALESTINE

HAIFA—Browne, Richard V.  
JERUSALEM—Wellings, Frank E.

## PERSIAN GULF

BAHREIN ISLAND  
Barger, Thomas Charles  
Brankamp, Richard Allen  
Steinke, Max

## PERU

LIMA—Fyfe, Douglas  
Jenks, William Furness

# MEMBERS

429

Newell, Norman D.  
Oppenheim, Victor E.  
NEGRITOS—Bell, A. Lyndon  
TALARA—Nauss, Arthur William

## PORTUGAL

LISBON—Mendelsohn, Clive A.

## PRINCE EDWARD ISLAND

CHARLOTTETOWN  
Chapin, Theodore  
West, Donald Milton

## QUEBEC

QUEBEC CITY—Jones, I. W.

## SASKATCHEWAN

MOOSE JAW  
Fox, Frederick Glen  
Sproule, John Campbell

## SCOTLAND

EDINBURGH  
Brown, James Chapman  
PITTENWEEN FIFE  
Williamson, Thomas F.

## SUMATRA

MEDAN—Paap, Aontonic  
PALEMBANG—Ellis, George L.

## SWITZERLAND

AARGAU—Gutzwiller, Otto  
BASEL—Braendlin, Emil  
Keller, Walter T.  
Ritter, Ernest A.  
Staehelin, Peter Karl  
Vonderschmitt, Louis

LAUSANNE—Gagnebin, Elie A.  
NEUCHÂTEL  
Wasserfallen, Bernard  
ZÜRICH  
Frischknecht, Gustav

## SYRIA

BEYRUTH—Birembaut, Arthur

## TRINIDAD

FOREST RESERVE  
Bower, Thomas Henry  
Payne, Arthur L.  
Young, Raymond Owen  
PALO SECO  
Wilson, Cedric Clarke  
POINTE-A-PIERRE  
Barr, Kenneth William  
Griffiths, John Cedric  
Higgins, George Esmond  
Jowett, Maurice Wilson  
Kugler, Hans G.  
Renz, Hans Herman  
Rogers, Harry Samuel  
Rohr, Karl  
Stainforth, Robert M.  
Suter, Hans H.  
Thomas, Hallowell C. H.

POINT FORTIN

Waite, Stephen Temple

SAN FERNANDO

Boutakoff, Nicholas

Penny, Frederick W.

SIPARIA—Scott, Gerald Hugh

ST. AUGUSTINE

Caudri, Cornelie M. B.

## TURKEY

ANKARA—Tasman, Cevat E.

## URUGUAY

MONTEVIDEO  
Vercesi, Daniel Roy

## VENEZUELA

BARCELONA  
Funkhouser, Harold John  
Hedberg, Hollis D.  
Johnson, Frank Walker  
Lockett, George L.  
Rincones, Carlos Vogeler  
Weber, David M.

CARACAS—Aguerrevere, Pedro I.

Aguerrevere, Santiago E.

Boylan, Ebert E.

Bray, Vinton Arthur

Conrad, Peter Paul

Crebs, Chester M.

Curtice, A. Arthur

Davis, Irion Grady

de Juana, Clemente Gonzalez

Floyd, Florin W.

Freie, A. J.

Henry, Leonard W.

Hill, Robert Grant

Iddings, Arthur

Judson, Jack Finlay

Kaufmann, Godfrey F.

Kaye, M. Kamen

Kehr, Louis

Kleckler, John Benedict

Lee, Clarence L.

LeRoy, Frank Leon

Martin, Francis I.

Martin, Rudolf

Mason, John Frederick

Mix, Adrian Elroy

Monaghan, Richard Joseph

Nolan, Philip E.

Patterson, Joseph M.  
Perkinson, Floyd  
Poulin, John A.  
Regan, John H.  
Rivero, Manuel  
Sherman, Roger H.  
Sutton, Frederick A.  
Tipsword, Howard Lee  
Weisbord, Norman E.  
Wilson, Joe G.  
Wilson, Thomas C.  
Zaikowsky, Michael W.  
Zuloaga, Guillermo

## CARIPITO

Ackerman, Edgar Dumont

Beckmann, Lawrence J.

Borger, Harvey D.

Loeffler, Richard John

Myers, LeMoyné Ward

Tuohy, John D.

Winkler, Virgil Dean

MARACAIBO—Allen, John O.

Baggelaar, Hermanus

Dawson, Herbert Marion

Dickinson, George

Dominguez D., Jose Rafael

Douglas, John G.

Fahle, Paul Bartlett

Hegwein, Walter H.

Howe, Ralph H.

Jopling, Don Winter

Pospisil, Frank J.

Ratway, Joseph

Sawyer, Joseph Herbert

Schaub, Hans Peter

Walpole, Leonard W.

MATURIN

Fowler, Charles W., Jr.

Kemp, Edward Rogers

Moore, Bernard Nettleton

## THE ASSOCIATION ROUND TABLE

## FINANCIAL STATEMENT FOR THE YEAR 1943

*To the Executive Committee,  
The American Association of Petroleum Geologists.*

In continuation of our examinations in prior years we have examined the accounting records of THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS for the year ended December 31, 1943, and now present our report together with the following statements:

*Exhibit*

- A Statement of Financial Condition, December 31, 1943
- B Statement of Income for the year ended December 31, 1943

*Schedule*

- \*1 Statement of Investments, December 31, 1943
- 2 Statement of Income from Publications for the year ended December 31, 1943
- 3 Statement of General and Administrative Expenses for the year ended December 31, 1943

In connection with our examination, we reviewed the system of internal control and the accounting procedures of the Association and, without making a detailed audit of the transactions, have examined or tested accounting records of the Association and other supporting evidence, by methods and to the extent we deemed appropriate. Our examination was made in accordance with generally accepted auditing standards applicable in the circumstances and included all procedures which we considered necessary.

Publications on hand at December 31, 1943, were priced as follows: 1943 publications at cost; 1942 and prior years publications at appraised values and a reserve provided for excessive quantities and old numbers, in accordance with a resolution adopted by the Executive Committee January 1, 1932.

Confirmation of securities in the custody of The New York Trust Company at December 31, 1943, was received directly from the custodian.

In our opinion, the accompanying statement of financial condition and related statement of income, supplemented by the supporting schedules, present fairly the position of The American Association of Petroleum Geologists at December 31, 1943, and the results of its operations for the year then ended in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

(Signed) ARTHUR YOUNG & COMPANY, *Accountants and Auditors*

TULSA, OKLAHOMA

February 7, 1944

\* Schedule 1 is not here published.

## EXHIBIT A

## STATEMENT OF FINANCIAL CONDITION DECEMBER 31, 1943

ASSETS		Total	General Fund	Publication Fund	Research Fund	Powers Metal Fund
CURRENT ASSETS:						
Demand deposits—						
The First National Bank and Trust Company, Tulsa, Oklahoma	\$ 41,930.34	\$ 41,930.34	\$ 41,930.34			
N. C. Bank of Commerce, Tulsa, Oklahoma	985.05	985.05	985.05			
TOTAL DEMAND DEPOSITS.....	\$ 42,935.39	\$ 42,935.39	\$ 42,935.39			
Accounts receivable—						
Membership dues less reserve of \$86.26	\$ 986.27	\$ 986.27	\$ 986.27			
Advertising.....	888.00	888.00	888.00			
Advance from The New York Trust Company	820.00	820.00	820.00			
Other accounts receivable less reserve of \$452.84	267.04	267.04	267.04			
TOTAL ACCOUNTS RECEIVABLE.....	\$ 2,961.40	\$ 2,961.40	\$ 2,961.40			
Accrued interest receivable less reserve of \$930.41.....	\$ 319.53	\$ 319.53	\$ 319.53			
Inventory of publications less reserve of \$22,423.98 (see report).....	\$ 14,931.74	\$ 14,931.74	\$ 14,931.74			
TOTAL CURRENT ASSETS.....	\$ 61,088.06	\$ 61,088.06	\$ 61,088.06			
INVESTMENTS at market which is \$4,421.83 less than cost.....	\$ 78,371.45	\$ 78,371.45	\$ 78,371.45			
FURNITURE AND FIXTURES less reserve of \$4,306.00.....	\$ 1.00	\$ 1.00	\$ 1.00			
DEFERRED CHARGES:						
Printing in progress.....	\$ 570.08	\$ 570.08	\$ 570.08			
Other deferred charges.....	89.16	89.16	89.16			
TOTAL DEFERRED CHARGES.....	\$ 659.24	\$ 659.24	\$ 659.24			
TOTAL ASSETS.....	\$140,110.75	\$140,110.75	\$140,110.75			
LIABILITIES AND SURPLUS						
CURRENT LIABILITIES:						
Accounts payable.....	\$ 1,604.98	\$ 1,604.98	\$ 1,604.98			
Accrued liabilities—						
Accrued printer's charges.....	594.26	594.26	594.26			
TOTAL CURRENT LIABILITIES.....	\$ 2,199.24	\$ 2,199.24	\$ 2,199.24			
DEFERRED INCOME:						
Memberships and subscriptions—						
Active memberships.....	\$ 12,414.54	\$ 12,414.54	\$ 12,414.54			
Associate memberships.....	2,280.50	2,280.50	2,280.50			
Subscriptions to Bulletin.....	3,219.35	3,219.35	3,219.35			
Advertising.....	\$ 17,914.39	\$ 17,914.39	\$ 17,914.39			
TOTAL DEFERRED INCOME.....	\$ 18,469.39	\$ 18,469.39	\$ 18,469.39			
SURPLUS:						
Balance, December 31, 1942.....	\$106,036.73	\$106,036.73	\$106,036.73			
Transfer of funds.....	—	—	—			
Net income—loss for the year ended December 31, 1943.....	13,414.39	13,414.39	13,414.39			
Balance, December 31, 1943.....	\$119,451.12	\$119,451.12	\$119,451.12			
CONTINGENT LIABILITIES:						
All known liabilities of the Association at December 31, 1943 were recorded in the accounts and no litigation was pending at that date.						
TOTAL LIABILITIES AND SURPLUS.....	\$140,110.75	\$140,110.75	\$140,110.75			

SUBJECT TO COMMENTS IN ACCOMPANYING REPORT

EXHIBIT B  
STATEMENT OF INCOME FOR THE YEAR ENDED DECEMBER 31, 1943

	Mem- bers	Annual Dues	Total	General Fund	Publication Fund	Research Fund	Powers Medal Fund
OPERATING INCOME:							
Dues for current period—							
Life membership.....	I	\$200.00	\$ 200.00	\$ —	\$ —	\$ —	\$ —
Active memberships.....	3,012	10.00	30,120.00	—	—	—	—
Associate memberships—							
Less than three years.....	483	6.00	\$2,898.00	\$ —	\$ —	\$ —	\$ —
Three to six years.....	336	8.00	2,688.00	—	—	—	—
Over six years.....	51	10.00	6,096.00	—	—	—	—
			<u>\$36,416.00</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>
Less: Transferred to "Income from Publications" (\$6.00 per member).....			23,118.00	—	—	—	—
			<u>\$13,298.00</u>	<u>\$13,298.00</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>
			11,180.51	9,701.69	1,478.82	—	—
			<u>\$24,478.51</u>	<u>\$22,999.69</u>	<u>\$1,478.82</u>	<u>\$ —</u>	<u>\$ —</u>
			19,233.03	18,946.56	70.50	—	215.97
			<u>\$ 5,245.48</u>	<u>\$ 4,053.13</u>	<u>\$1,408.32</u>	<u>\$ —</u>	<u>\$-215.97</u>
Net income from publications (Schedule 2)							
GENERAL AND ADMINISTRATIVE EXPENSES (Schedule 3)							
OTHER INCOME:							
Interest and dividends from investments.			\$2,372.55	\$1,793.68	\$518.72	\$ 60.15	\$ —
Adjustment of stated value of investments to market.....			2,760.39	2,212.15	399.49	148.75	—
Donations received.....			5,296.50	—	—	—	5,296.50
Recovery of accounts previously charged off.....			360.00	360.00	—	—	—
Miscellaneous.....			205.63	205.63	—	—	—
			<u>16,240.55</u>	<u>\$ 8,624.59</u>	<u>918.21</u>	<u>208.90</u>	<u>5,296.50</u>
				<u>\$2,326.53</u>	<u>\$ 208.90</u>	<u>\$ 208.90</u>	<u>\$5,080.53</u>
INCOME DEDUCTIONS:							
Convention expense—net.....			\$ 350.41	\$ 350.41	\$ —	\$ —	\$ —
Research project—				—	—	—	—
Tectonic Map of United States.....			975.75	—	975.75	—	—
Donation to Society of Economic Paleontologists and Mineralogists.....			1,500.00	1,500.00	—	—	—
			<u>1,500.00</u>	<u>1,850.41</u>	<u>—</u>	<u>975.75</u>	<u>—</u>
			<u>\$13,414.39</u>	<u>\$ 6,774.18</u>	<u>\$2,326.53</u>	<u>\$-766.85</u>	<u>\$5,080.53</u>
NET INCOME—Loss.....							

SUBJECT TO COMMENTS IN ACCOMPANYING REPORT

SCHEDULE 2—STATEMENT OF INCOME FROM PUBLICATIONS FOR THE YEAR ENDED DECEMBER 31, 1943

	Total		General Fund		Publication Fund	
<b>OPERATING INCOME:</b>						
Dues transferred.....		\$ 23,118.00		\$ 23,118.00		\$ —
Bulletin subscriptions.....		4,125.10		4,125.10		—
Advertising—net.....		8,728.54		8,728.54		—
Sales of bound volumes and special publications—						
Bound volumes of Bulletin.....	\$ 2,859.20		\$ 2,859.20			
Back numbers of Bulletin.....	1,448.46		1,448.46			
Possible Future Oil Provinces of the United States and Canada.....	328.24		328.24			
Permian of West Texas and Southeastern New Mexico.....	445.70		445.70			
Origin of Oil.....	120.00		120.00			
Symposium on Petroleum Discovery Methods.....	340.00		340.00			
Report of a Conference on Sedimentation.....	293.50		293.50			
Stratigraphic Type Oil Fields.....	1,206.01		—	1,206.01		
Source Beds of Petroleum.....	692.97		—	692.97		
Geology of Natural Gas.....	592.62		—	592.62		
Gulf Coast Oil Fields.....	343.63		—	343.63		
Geology of the Tampico Region.....	257.10		—	257.10		
Miocene Stratigraphy of California.....	266.50		—	266.50		
Recent Marine Sediments.....	63.00		—	63.00		
Tectonic Map of Southern California.....	30.85		—	30.85		
Regional Cross Sections.....	43.45		43.45			
Other publications.....	134.66		134.66			
		9,496.79		6,014.11		3,482.68
<b>TOTAL INCOME.....</b>		<b>\$45,468.43</b>		<b>\$41,985.75</b>		<b>\$3,482.68</b>
<b>COSTS AND EXPENSES:</b>						
Proportion of manager's salary.....	\$ 3,750.00		\$ 3,750.00			
Editorial salaries.....	3,080.50		3,080.50			
Printing Bulletins.....	16,328.20		16,328.20			
Engraving.....	1,750.93		1,750.93			
Special insert charges.....	181.76		181.76			
Stencil corrections and mailing.....	350.67		350.67			
Bulletin mailing and expense.....	705.36		705.36			
Copyright fees.....	24.00		24.00			
Reprints.....	161.88		161.88			
Binding Volume XXVI (1942).....	623.05		623.05			
Translating Regional Cross Sections.....	44.53		44.53			
Printing additional copies, Report of a Conference on Sedimentation.....	149.20		149.20			
Printing additional copies, Origin of Oil.....	178.50		178.50			
Binding additional copies, Geology of the Tampico Region.....	159.90		—	159.90		
Binding additional copies, Source Beds of Petroleum.....	150.16		—	150.16		
Other publications—freight, express, and postage.....	92.82		—	92.82		
Miscellaneous.....	50.38		42.63	7.75		
	\$28,741.84		\$28,331.21		\$ 410.63	
Add: Inventory decrease.....	5,546.08		3,952.85		1,593.23	
<b>TOTAL COSTS AND EXPENSES.....</b>		<b>34,287.92</b>		<b>32,284.06</b>		<b>2,003.86</b>
<b>NET INCOME FROM PUBLICATIONS.....</b>		<b>\$11,180.51</b>		<b>\$ 9,701.69</b>		<b>\$1,478.82</b>

SUBJECT TO COMMENTS IN ACCOMPANYING REPORT

## THE ASSOCIATION ROUND TABLE

## SCHEDULE 3

STATEMENT OF GENERAL AND ADMINISTRATIVE EXPENSES FOR  
THE YEAR ENDED DECEMBER 31, 1943

## GENERAL FUND:

Proportion of manager's salary .....	\$ 4,250.00
Clerical salaries .....	5,353.45
Postage .....	1,920.45
Office rent .....	1,674.00
Office supplies and expenses .....	564.22
Telephone and telegraph .....	304.09
Printing and stationery .....	580.57
Freight and express .....	270.39
Insurance .....	239.29
Audit fee .....	300.00
Investment counsel .....	400.00
Traveling expenses .....	205.74
Depreciation .....	111.33
Bad debts .....	1,002.23
Distinguished Lecture Committee expense .....	500.00
National Service Committee expense .....	364.62
"American Geological Association" expense .....	327.50
Taxes .....	422.10
Miscellaneous .....	156.58
	<hr/>
	\$18,946.56

## PUBLICATION FUND:

Miscellaneous .....	\$ 70.50
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## SIDNEY POWERS MEMORIAL MEDAL FUND:

Postage .....	\$ 123.50
Printing .....	92.47
	<hr/>
	215.97

TOTAL GENERAL AND ADMINISTRATIVE EXPENSES .....	<hr/>	\$19,233.03
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SUBJECT TO COMMENTS IN ACCOMPANYING REPORT

FINANCIAL STATEMENT, DIVISION OF PALEONTOLOGY  
AND MINERALOGY, FOR THE YEAR 1943

To the Council,  
*Society of Economic Paleontologists and Mineralogists.*

In continuation of our examinations in prior years we have examined the accounting records of the SOCIETY OF ECONOMIC PALEONTOLOGISTS AND MINERALOGISTS for the year ended December 31, 1943, and now present our report together with the following statements:

*Exhibit*

- A Statement of Financial Condition, December 31, 1943
- B Statement of Income for the year ended December 31, 1943

*Schedule*

- I Statement of Receipts and Disbursements for the year ended December 31, 1943

In connection with our examination, we reviewed the system of internal control and the accounting procedures of the Society and, without making a detailed audit of the transactions, have examined or tested accounting records of the Society and other supporting evidence, by methods and to the extent we deemed appropriate. Our examination was made in accordance with generally accepted auditing standards applicable in the circumstances and included all procedures which we considered necessary.

Inventory of publications represents approximately 30,150 Journals (exclusive of Journals in excess of complete sets for issues prior to 1943) including certain issues printed at the expense of the Paleontological Society for the years 1935 to 1943, inclusive, stated at appraised values of fifty cents each for Journals printed prior to 1943 or cost to either the SOCIETY OF ECONOMIC PALEONTOLOGISTS AND MINERALOGISTS or the PALEONTOLOGICAL SOCIETY for Journals printed in 1943. The SOCIETY OF ECONOMIC PALEONTOLOGISTS AND MINERALOGISTS has agreed to distribute a portion of its income to the Paleontological Society; the amount accruing to the latter for the year 1943 amounted to \$341.03.

In our opinion the accompanying statement of financial condition and related statement of income present fairly the position of the SOCIETY OF ECONOMIC PALEONTOLOGISTS AND MINERALOGISTS at December 31, 1943, and the results of its operations for the year, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

(Signed) ARTHUR YOUNG & COMPANY, *Accountants and Auditors*

TULSA, OKLAHOMA  
February 7, 1944

## THE ASSOCIATION ROUND TABLE

## EXHIBIT A

## STATEMENT OF FINANCIAL CONDITION, DECEMBER 31, 1943

ASSETS		
CURRENT ASSETS:		
Demand deposits—		
The First National Bank and Trust Company, Tulsa, Oklahoma . . .	\$ 3,368.36	
National Bank of Commerce, Tulsa, Oklahoma . . . . .	107.25	\$ 3,475.61
Savings deposit—		
The First National Bank and Trust Company, Tulsa, Oklahoma . . .		2,209.51
Accounts receivable		
Printed matter less reserve of \$84.00 . . . . .	\$ 52.50	
Other . . . . .	11.91	64.41
TOTAL CURRENT ASSETS . . . . .		\$ 5,749.53
INVENTORY OF PUBLICATIONS—see report . . . . .		16,111.37
FURNITURE AND FIXTURES . . . . .	\$ 482.60	
Less: Reserve for depreciation . . . . .	288.98	193.62
DEFERRED CHARGE:		
Prepaid printing . . . . .		325.54
TOTAL ASSETS . . . . .		<u>\$22,380.06</u>
LIABILITIES AND SURPLUS		
CURRENT LIABILITIES:		
Accounts payable . . . . .	\$ 638.73	
Accrued taxes . . . . .	11.28	
Amount due to Paleontological Society . . . . .	341.03	
TOTAL CURRENT LIABILITIES . . . . .		\$ 991.04
DEFERRED INCOME:		
Subscriptions to Journals . . . . .	\$ 1,465.95	
Membership dues for 1944 and 1945 . . . . .	825.66	2,291.61
SURPLUS:		
Balance, December 31, 1942 . . . . .	\$18,471.28	
Net income for the year ended December 31, 1943 (Exhibit B) . . . . .	626.13	
Balance, December 31, 1943 . . . . .		19,097.41
TOTAL LIABILITIES AND SURPLUS . . . . .		<u>\$22,380.06</u>

SUBJECT TO COMMENTS IN ACCOMPANYING REPORT

## THE ASSOCIATION ROUND TABLE

437

## EXHIBIT B

## STATEMENT OF INCOME FOR THE YEAR ENDED DECEMBER 31, 1943

## OPERATING INCOME:

Dues and subscriptions—		
Journal of Paleontology and Sedimentary Petrology.....	\$ 728.00	
Journal of Paleontology.....	2,559.10	
Journal of Sedimentary Petrology.....	762.12	
	<hr/>	
	\$4,049.22	
Sales of back numbers—		
Journal of Paleontology.....	\$ 439.70	
Journal of Sedimentary Petrology.....	189.00	628.70
	<hr/>	
Sales of plates and reprints.....		308.15
Advertising.....		63.10
		<hr/>
		\$5,049.17
Less: Proportion of income accrued to Paleontological Society.....		341.03
		<hr/>
		\$4,708.14

## COSTS AND EXPENSES:

Cost of printing—		
Journal of Paleontology.....	\$3,106.56	
Journal of Sedimentary Petrology.....	942.78	
	<hr/>	
	\$4,049.34	
Clerical salaries.....	881.00	
Office rent.....	310.00	
Postage and mailing.....	348.25	
Audit fee.....	100.00	
Office supplies and expenses.....	103.64	
Depreciation.....	48.26	
Taxes.....	32.62	
Other costs and expenses.....	78.19	
	<hr/>	
	\$5,951.30	
Less: Increase in inventory of publications.....	340.86	5,610.44
	<hr/>	
		\$-902.30

## NON-OPERATING INCOME:

Donation from American Association of Petroleum Geologists.....	\$1,500.00	
Interest on savings deposit.....	21.92	
Miscellaneous.....	6.51	1,528.43
	<hr/>	

NET INCOME.....		<hr/>
		\$ 626.13
		<hr/>

SUBJECT TO COMMENTS IN ACCOMPANYING REPORT

## THE ASSOCIATION ROUND TABLE

## SCHEDULE 1

STATEMENT OF RECEIPTS AND DISBURSEMENTS  
FOR THE YEAR ENDED DECEMBER 31, 1943

DEMAND DEPOSITS, DECEMBER 31, 1942..... \$2,561.76

## RECEIPTS:

## Membership dues and subscriptions—

## Year 1943—

Journal of Paleontology and Sedimentary Petrology...	\$ 808.00	
Journal of Paleontology.....	2,303.40	
Journal of Sedimentary Petrology.....	724.82	\$3,836.22

## Years 1944 and 1945—

Journal of Paleontology.....	\$ 466.15	
Journal of Sedimentary Petrology.....	158.60	624.75

## Sales of back numbers—

Journal of Paleontology.....	\$ 270.70	
Journal of Sedimentary Petrology.....	103.80	374.50

## Sales of plates and reprints.....

304.24

## Accounts receivable.....

225.35

## Donation from American Association of Petroleum Geologists.....

1,500.00

## Miscellaneous.....

289.65

7,154.71

\$9,716.47

## DISBURSEMENTS:

## Printing expenses—

Journal of Paleontology.....	\$2,074.98	
Journal of Sedimentary Petrology.....	821.84	
Engraving Journal of Paleontology.....	935.28	\$3,832.10

## Postage and mailing.....

223.15

## Office rent.....

310.00

## Clerical salaries.....

800.28

## Audit fee.....

100.00

## Payment to Paleontological Society.....

336.80

## Editorial salaries.....

295.00

## Taxes.....

112.81

## Refunds on subscriptions.....

14.67

## Office supplies and expenses.....

37.00

## Miscellaneous.....

179.05

6,240.86

DEMAND DEPOSITS, DECEMBER 31, 1943..... \$3,475.61

SUBJECT TO COMMENTS IN ACCOMPANYING REPORT

## NEW HONORARY MEMBERS

Charles Newton Gould, director of the Oklahoma Geological Survey, 1924-1931, and William Embry Wrather, director of the United States Geological Survey, were elevated to honorary membership in the Association, by action of the executive committee in meeting at Los Angeles, California, October 13, for "distinguished service to the cause of petroleum geology."



Photo by M. G. Cheney

## CHARLES N. GOULD AND W. E. WRATHER

This informal picture was taken on one of the most recent occasions when Gould and Wrather were together,—the ceremony at which the ashes of Robert T. Hill were scattered over Round Mountain, Comanche County, Texas, October 26, 1941. Photograph reproduced through the courtesy of M. G. Cheney.

## CHARLES NEWTON GOULD, HONORARY MEMBER

JOHN L. FERGUSON<sup>1</sup>

Tulsa, Oklahoma

The hundreds of Association members, who have learned to know and appreciate Charles N. Gould during his forty and more years of service to Oklahoma and the Southwest, will rejoice that he has received this well deserved recognition of his contributions to the geology of petroleum and to the education of geologists.

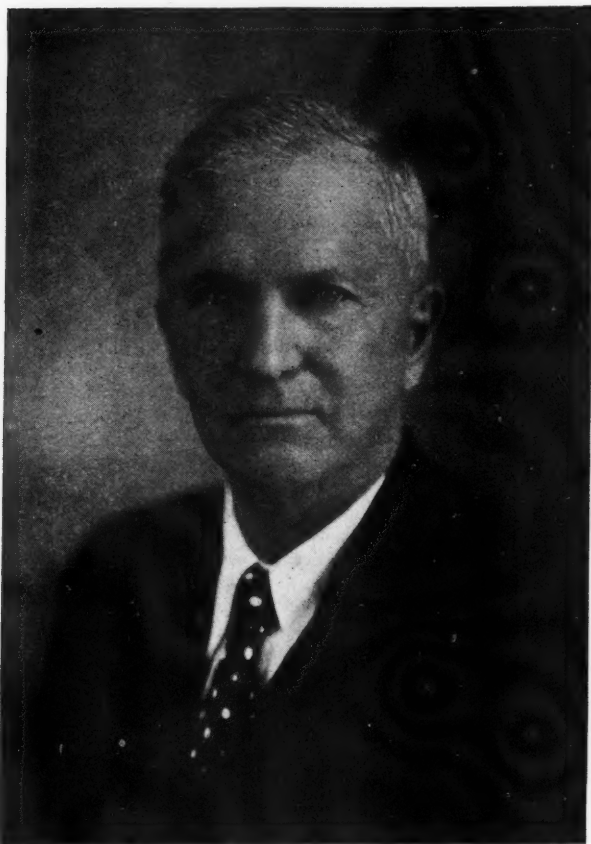
Now that his days in the field and classroom are largely past, Dr. Gould has once again returned to his old stamping ground to finally record the picturesque story of the early days of Oklahoma geology. During the busy and urgent days of the growth of the University and the development of the Survey, there was no time to spare for historical treatises, for the ever increasing wealth of new geological data demanded new publications for the benefit of Oklahoma. But now the task of publicizing scientific information and training young minds has passed into younger hands, and the man who made Oklahoma geology grow can take the time to cull his store of information and record the almost legendary tales of the pioneers of geology in the Southwest, not the least of whom was Charles Newton Gould.

His history has been bound up with the Southwest. After spending his youth as a farm boy in Ohio, he was taken in 1887 to western Kansas, where his father settled on a farm near Ninnescah. From this time Charles Gould belonged to the Great Plains, and immediately began sinking his roots. He was now 19 years old, and, having an intense interest in learning, he easily developed a faculty for instructing. He quickly secured a teaching certificate and took over a succession of country schools in Pratt and Kingman counties, thus increasing the family income during the winter, while his help on the farm was less essential. His thirst for knowledge was not satisfied by teaching alone, and, by dint of careful saving, he was able to enter Southwestern College at Winfield, Kansas, in 1892. For the next seven years he studied at the college, taught school, worked on the farm, gathered a little money, re-entered the college, and by dogged perseverance won his way to his bachelor's degree in June, 1899.

These hard years were fruitful years, for it was during one of his interim teaching jobs that Gould recognized geology as his life work. Having found some fossil oyster shells, he submitted them to Samuel W. Williston, the great vertebrate paleontologist, then at the University of Kansas. Williston complimented Gould on his keenness of observation, encouraged him to seek out other fossil localities and later examined these findings in the field. Contact with this great scientist stimulated Gould's growing interest in geology and he submitted material to other geologists. His zeal was rewarded by field excursions with Robert T. Hill, Charles S. Prosser, Lester F. Ward, T. W. Stanton, and J. W. Beede, all stalwarts of geology, and his choice of geology as a life-work was confirmed.

With his customary dogged determination, he then set three goals for his future, even before he had achieved the bachelor's degree which he was working toward with such perseverance. He would learn as much as possible about the geology and mineral resources of the southern part of the Great Plains; he would occupy the chair of geology in a State university; he would become a State geologist. His second goal was achieved scarcely a year after his graduation from Southwestern. His third goal was reached in 1908 when he had the Oklahoma Geological Survey written into the constitution of the new State and became its first director. But, his first goal will always be just beyond his reach, for there is no limit to the knowledge which a man like Charles N. Gould will seek to add to the store which he already possesses.

<sup>1</sup> Amerada Petroleum Corporation, Manuscript received, February, 1944.



CHARLES NEWTON GOULD

After a year of graduate work at the University of Nebraska, where he won his Master of Science degree, for studying the fossil leaves of the Dakota sandstone, Charles N. Gould was called to the young and struggling University of Oklahoma to establish a department of geology and to assist in vitalizing the Territorial Geological and Natural History Survey. He arrived in Norman in June, 1900, and this town became the center of his existence. Here he began the field work of the Territorial Survey, which expanded steadily and formed the basis for the Oklahoma Geological Survey. Here he established the department of geology which became the School of Geology and expanded to include the largest enrollment of geological students in any university in the world. Here he met and married Nina Swan, a gracious and devoted wife and counselor who cheerfully shared his problems, encouraged his efforts, and enriched his life for many years. Here his children were born, raised, and educated in the rapidly expanding university. His daughter, Lois Hazel, met and married at Norman, Dr. R. D. Bird, who is now Provincial Entomologist of Manitoba,

Canada. His son, Dr. Donald Boyd Gould, started at Norman the geological career which has carried him to the head of the department of geology at Colorado College, Colorado Springs, Colorado.

The early days at Norman were beset with many trials, but the ever-present and fascinating geological problems took him to the field every summer, travelling in a covered wagon. He worked at times for the United States Geological Survey or the Bureau of Reclamation or the Territorial Survey, and later for the Oklahoma Geological Survey, but every summer he was in the field, pushing toward that first goal, of learning all he could about the geology of the Southwest.

What he found, he passed on for the use of all in whatever medium was available, Survey publications, University publications, newspapers, lectures, field trips, or curb-stone conversations. He felt that geology was there for everyone to use and enjoy, and he believed in spreading knowledge of it to all who would listen.

Gould's own thirst for knowledge was not satisfied by observation alone, and he felt the need of more disciplined instruction. This desire was partly met by a sabbatical leave spent at eight leading universities and ending at the University of Nebraska, where he secured his Doctorate of Philosophy in 1906. In 1928 Nebraska further acknowledged his achievements with the honorary degree of Doctor of Science. This honor was followed by the bestowal of an honorary degree of Doctor of Laws by Oklahoma City University in 1932.

As the department of geology expanded, Dr. Gould's interest in scientific matters broadened, and he became a member of numerous scientific bodies including the Geological Society of America, the American Institute of Mining Engineers, the Paleontological Society of America, the American Association for the Advancement of Science, the Institute of Petroleum Technologists, the Royal Society of Arts, the International Geological Congress. He has been a prominent figure in the Oklahoma Academy of Science which he served twice as president. He was also a strong force in the establishment of the American Association of Petroleum Geologists, and gave the initial paper at the inaugural meeting at Norman, Oklahoma, in January, 1916. Dr. Gould was invited into numerous scientific and scholarly fellowships such as Phi Beta Kappa, the Society of the Sigma Xi, Sigma Gamma Epsilon, Phi Sigma, and Pi Gamma Mu.

By 1911 the Department and the Survey had gained sufficient stature to carry on without his guidance, and with the steadily growing interest in oil and gas in Oklahoma, he felt he should test his geological skill in locating favorable areas for developing new oil and gas fields. It was not easy to leave the work to which he had become accustomed, in order to take up a new activity which had many discouraging features. However, he determined to make the change and presented his resignation to the State and University.

His wide knowledge of the structure of Oklahoma, Kansas, and Texas assisted him greatly, and during the period of his commercial work from 1911 to 1924, he was largely responsible for the discovery of several oil and gas fields including the Panhandle and South Bend fields in Texas, Poteau, Carter-Knox, and Muskogee fields in Oklahoma and the Augusta field in Kansas. His greatest triumph was the discovery of the Panhandle gas field, which he first recognized as structurally interesting in 1903, when he observed three domes along the Canadian River north of Amarillo. When he proposed mapping them after he began his commercial activities, no oil man was interested in drilling thousands of feet of unpromising strata in the center of the Permian basin, 225 miles from the nearest production. However, Gould finally persuaded a group of Amarillo businessmen and ranchers to organize a company to explore and test these structures. Plane-table mapping of the John Ray dome in northeastern Potter County revealed an anticline which exceeded even Gould's expectations, and he urged the drilling of a test well. This first test, the Amarillo Oil Company's Masterson No. 1, was commenced in 1918 with the expectation of drilling a long section of barren Permian strata before reaching productive sands, but

to everyone's amazement gas was found in ever increasing quantities from 1,600 feet down and the well was completed for approximately 10 million cubic feet at the depth of 2,605 feet. Additional tests on and adjacent to the Masterson Ranch quickly revealed the tremendous gas reserve which was available if and when it could be piped to adequate markets. Later testing of the other domes established the anticlinal axis of the "Panhandle ridge" and revealed the presence of important oil reserves on its north flank. Dr. Gould received great satisfaction from confounding the "experts" who ignored the implications of the huge structural feature, while they busily added up the thicknesses of the section which theoretically should occur in Potter County, Texas.

Like most State geological surveys, the Oklahoma Survey suffered from the attacks of hostile politicians, and in 1923 it lost its appropriation and became inactive. Influential men immediately rallied to its support and in 1924 Dr. Gould was persuaded that it was his duty to revitalize this child of his earlier years. He returned to Norman and for more than seven years he served again as director. It was during this period that he was able to build up excellent coöperation with the petroleum geologists in the state and with the United States Geological Survey, thus making the Survey of greatest value to the people of Oklahoma. At this time his most ambitious work, "Oil and Gas in Oklahoma," was published as *Bulletin 40*. This was an exhaustive three-volume treatise on the geology and oil production of Oklahoma by counties, written by many contributing geologists, with Dr. Gould in charge of the editing, compilation, and publishing. In addition, twenty-two other bulletins were published on various phases of geology and Dr. Gould collaborated in four of them.

In 1931 a wave of economy washed over Oklahoma institutions and the Geological Survey was caught in the flood and left high and dry without an appropriation. While Dr. Gould was deeply hurt at the summary execution of this worthwhile agency, he was consoled by the fact that he would now have time to do some of the historical writing which he had long thought about. He laid plans for several volumes, the first of which was *Oklahoma Place Names*, in which he traced the names of Oklahoma towns and geographical features to their origin. He had hardly completed this volume and started on his next work, when he was asked to join the National Park Service as regional geologist. This seemed to offer him another opportunity for service to the people and observation of interesting geological problems, so he accepted. For five years Dr. Gould travelled through eight southwestern states advising regarding water supply, road materials, and general geological problems in the National Parks and Monuments and State Parks.

In 1940 he returned to Norman, resolved to complete his historical writings. Now he has no less than four different volumes at various stages of completion, dealing with subjects ranging from early land surveys to his autobiography. A wealth of colorful information will be preserved for posterity in these works.

During his career, Dr. Gould has accumulated a bibliography of more than 250 titles, covering publications in which he has given without stint the available information on geology and natural resources which would interest and enlighten the professional geologist or the layman. It is not fitting to pick out any particular volume for especial mention, for they were all written for the information of his fellow-man.

For more than forty years Charles N. Gould has been actively acquiring and passing on information regarding the geology of Oklahoma and its neighbor states, as a teacher, a survey official, and as a geological consultant. Through his enthusiasm for geology and his zest for disseminating information about it, he has attracted many young men to the science, and has made available to them a vast store of geological data. All those who have studied geology at the University of Oklahoma have felt the influence of his activities, and the geologists who have worked within the boundaries of Oklahoma have been ever grateful for the publications which he wrote and sponsored.

WILLIAM EMBRY WRATHER—AN APPRECIATION<sup>1</sup>ELLIS W. SHULER<sup>2</sup>

Dallas, Texas

Our new director of the United States Geological Survey was born in Brandenburg, Kentucky, in 1883. It was during his student days at the University of Chicago, where he took his undergraduate and graduate work, that his teacher, Dr. Rollin D. Salisbury, realizing his unusual abilities, urged that he take up geology as his profession. In 1908 he came to Texas as petroleum geologist for the Gulf Production Company but since 1916 he has been a consulting geologist with headquarters in Dallas, Texas.

Among Wrather's notable achievements as a geologist were the leasing and discovery of the Desdemona oil field. Recognized as an authority, he has served as expert witness in many important legal battles. His ability as a speaker and teacher has been fully recognized in his selection as special lecturer in petroleum geology at Northwestern University, Texas University, Yale University, Southern Methodist University, and at the University of Chicago.

Few American geologists have traveled more widely than has "Bill" Wrather. In addition to private trips through Europe, he was a delegate to three International Geological Congresses—at Madrid, Pretoria, and Moscow. Always with a battery of cameras, he accompanied international guides throughout Europe, across Russia, and from Cairo to Capetown. He himself served as a guide and also as author of a guide book for the Washington meeting in 1933.

Wrather has given whole-hearted allegiance to his adopted state, Texas. He has collected its early books and maps, has interested himself in every phase of its folk lore, and for ten years has served as president of the Texas State Historical Association.

Wrather early urged coöperation and solidarity among professional geologists in the days when there was much secrecy and distrust. He helped to organize the Southwestern Geological Society and was its second president. He has taken an active part in the programs of its successor, the Dallas Petroleum Geologists.

A member of the 1917 group which organized the American Association of Petroleum Geologists, he served as its president, 1922–1923. He has been a Fellow of the Geological Society of America since 1923 and has served as counselor and vice-president of that organization. He was chairman of the Petroleum Division of the American Institute of Mining and Metallurgical Engineers in 1933, and president of the Society of Economic Geologists in 1934.

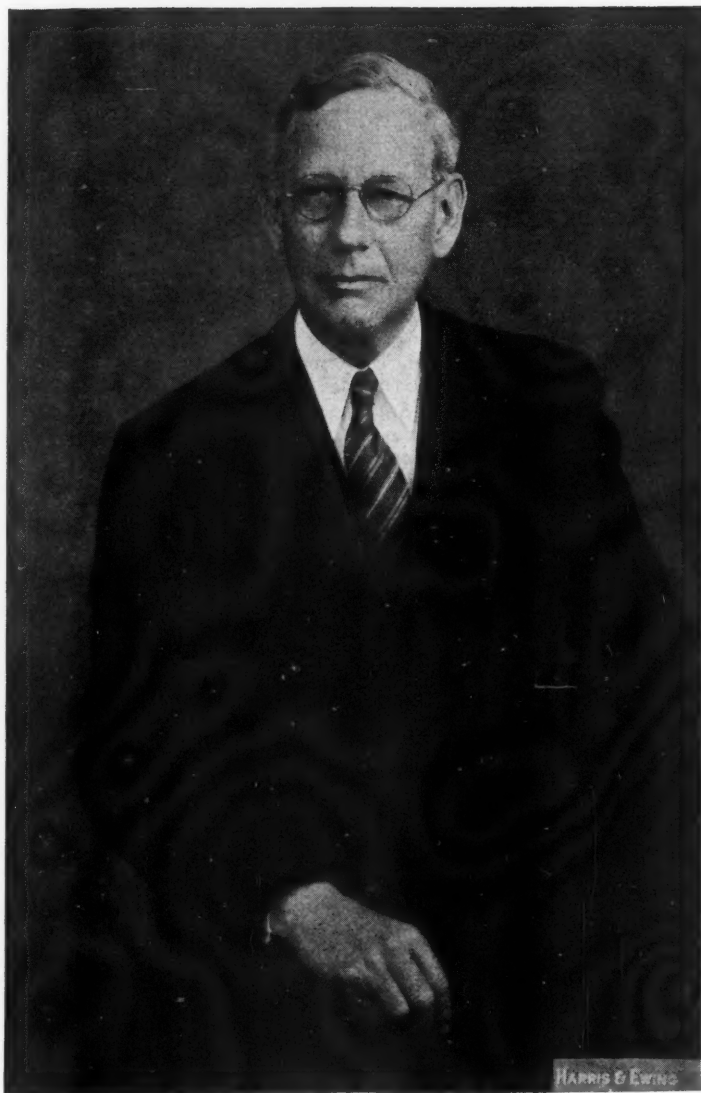
He is the author of numerous articles, particularly dealing with oil and gas, in publications of the A.A.P.G., the A.I.M.E., and in other technical journals. With F. H. Lahee, he edited *Problems of Petroleum Geology* in 1934.

As his chief hobby and aid to his profession, he has chosen photography. It is here he finds release for his artistic abilities, and his numerous pictures and kodachrome slides form a superb collection ranging from birds, flowers, and geological illustrations to intimate views of foreign lands.

Dallas Petroleum Geologists yield to the superior call of Washington and a nationwide service; but we will keep in mind Bill's intimate whole-hearted greeting and the comforting knowledge that he will always be in every crisis a loyal friend.

<sup>1</sup> Because of Mr. Wrather's absence from the United States, on a mission to the Near and Middle East, it was impossible to prepare a full biography for this issue of the *Bulletin*. This appreciation, written by Dr. Shuler, a friend through many years and a resident of Wrather's home town, Dallas, is here reproduced by courtesy of the author and the *Dallas Digest* of March, 1944.

<sup>2</sup> Professor of geology, Southern Methodist University.



WILLIAM EMBRY WRATHER

## AT HOME AND ABROAD

### CURRENT NEWS AND PERSONAL ITEMS OF THE PROFESSION

The Michigan Geological Society held its annual meeting at Morrill Hall on the Michigan State College campus at East Lansing, February 4. Officers elected for 1944 are: present, EDWARD J. BALTRUSAITIS, Gulf Refining Company, Saginaw; vice-president, RAYMOND S. HUNT, consulting geologist, Mt. Pleasant; secretary-treasurer, THOMAS S. KNAPP, The Chartiers Oil Company, Box 227, Mt. Pleasant; business manager, LEE S. MILLER, Michigan Geological Survey, Lansing. Five papers given at the meeting were part of a symposium organized by Raymond S. Hunt: "Relation of Structure to Oil Production in Michigan."

1. WILLIAM SCHULTZ, Cities Service Oil Company, "The Vernon and Wise Pools."
2. WILLIAM F. BROWN, consulting geologist, of Mt. Pleasant, "The Arenac and Ogemaw County Productive and Non-Productive Structures."
3. GORDON H. PRINGLE, The Ohio Oil Company, "The Reed City Pool, Cedar Pool, and the Unproductive Dundee Anticline under the Rose Lake Pool."
4. THOMAS S. KNAPP, "The Sherman Oil Pool, the Pine River Pool, and the Fremont Township 'High' in Isabella County."
5. RAYMOND S. HUNT, "Traverse Production in the Walker Pool and Several Un-productive 'Highs' to the Southeast," and "The Howell Fault Area."

In addition to the symposium subject, LEE S. MILLER gave a paper on "The Conservation of Reservoir Energy in Oil Pools."

C. W. SANDERS has accepted the position of chief geologist for the Danciger Oil and Refining Company, W. T. Waggoner Building, Fort Worth, Texas. His new residence address is 2413 Colonial Parkway, Fort Worth.

LEONARD J. NEUMAN, whose geological and engineering office is at 548 Mellie Esperson Building, Houston, Texas, operates several reflection and refraction seismograph crews from his office at 943 Mellie Esperson Building. He specializes in salt-dome problems.

DONALD K. MACKAY is senior analyst in the Petroleum Division of the Foreign Economic Administration, Washington, D. C.

R. F. IMBT is in the Mining Division of the War Production Board at Washington, D. C.

The annual meeting of the Branner Geological Club of Southern California was held at the Athanaeum at the California Institute of Technology in Pasadena on February 4. The principal address was given by HOYT S. GALE and RODNEY GALE on the geology of the Kramer borax deposits in southern California, and EARL B. NOBLE showed colored motion pictures of Costa Rica and Guatemala. Officers elected at the meeting for the coming year were: E. ROBERT ATWILL (Union Oil Company), president; BENO GUTENBERG (California Institute of Technology), vice-president; and CLIFTON JOHNSON (Richfield Oil Company), secretary-treasurer. Retiring officers are: HERSCHEL DRIVER (Standard Oil Company), president; ROBERT W. WEBB (University of California at Los Angeles), vice-president; and VINCENT W. VANDIVER (Seaboard Oil Company), secretary-treasurer.

H. S. McQUEEN, formerly assistant State geologist of Missouri, has joined the geological staff of the Republic Mining and Manufacturing Company, the exploration and mining

subsidiary of the Aluminum Company of America. He will be located at company headquarters, 230 Park Avenue, Room 2535, New York (17), N. Y.

Geologists in Casper, Wyoming, met the later week in December, and decided to have an informal luncheon meeting every Friday. This practice has been carried out since January 7. Meetings are held at the Townsend hotel every Friday noon at 12, with an attendance of 15 to 30 petroleum geologists or engineers, and visitors. Anyone visiting Casper on any Friday is invited to meet with the group. The number of A.A.P.G. members in Casper has more than doubled since the March, 1943, directory. C. J. HARES, of the Ohio Oil Company, is chairman of the group, and RAYMOND M. LARSEN, of the U.S.G.S., is vice-chairman and secretary.

IRA H. CRAM, of the Pure Oil Company, Chicago, Illinois, described "The Geology of the Cumberland Field, Marshall County, Oklahoma," at the regular meeting of the Tulsa Geological Society, February 21.

F. A. SUTTON, formerly with the Lago Petroleum Corporation at Maracaibo, is with the Creole Petroleum Corporation at Caracas, Venezuela.

DAVID A. DUNN, formerly consulting geologist at Lubbock, Texas, is now a captain at Roswell, New Mexico, Army Air Field.

JOHN B. KERR is mining engineer with the U. S. Bureau of Mines, Mining Division, with headquarters at Little Rock, Arkansas, in connection with the bauxite project in south-central Arkansas. His address is 419 Louise Street, Little Rock.

EDWARD BENNETT MATHEWS, professor emeritus of mineralogy and petrography at the Johns Hopkins University, Baltimore, died on February 4 at the age of 74 years. He was State geologist of Maryland for many years, and for many years he was treasurer of the Geological Society of America.

G. F. SHEPHERD and G. I. ATWATER presented a paper on "Geologic Application of Drilling Time Data," before the Houston Geological Society, February 17.

J. M. BUGBEE, formerly with the Standard Oil Company of California, and more recently with the National Lead Company, is in the exploration division of the Shell Oil Company, Inc., at Houston, Texas.

H. FOSTER BAIN may be addressed at his home, Tomochonck Ranch, Steamboat, Nevada.

ARTHUR KEITH, geologist of the U. S. Geological Survey until his retirement several years ago, died on February 7, at the age of 79 years. He was a president of the Geological Society of America and a treasurer of the National Academy of Sciences.

HOWARD S. BRYANT is vice-president of the Bridgeport Oil Company, Inc. (formerly Hollow Drilling Company), Box 730, Wichita 1, Kansas.

CHARLES A. RENFROE is in the geological department of the Phillips Petroleum Company, Midland, Texas.

V. E. TIMS is in the employ of the Standard Oil Company of Texas, Graham, Texas.

A. RODGER DENISON, president of the Association, addressed a meeting of geologists at the Illinois Geological Survey, Urbana, Illinois, at a dinner on February 18. His subject was "Status of Geology and Geologists." The Survey held "open house" for visitors the following day.

Major WILLARD J. CLASSEN, Army Air Corps, has been placed on an inactive status and has returned to the oil industry after 20 months service in the armed forces. He has taken over the duties of chief geologist for the Wilshire Oil Company and affiliated companies. Prior to his entry into the service he had maintained offices in the Mills Building in San Francisco as a consulting geologist and petroleum engineer since October, 1934. Major Classen plans to reside in Bakersfield, California, where he is opening offices for the company.

ARNOLD D. HOFFMAN, consulting geologist and micropaleontologist, 7 South Dearborn Street, Chicago, Illinois, is the author of a mineral report and mineral map in "Regional Planning—Part XII, Arkansas Valley," published by the National Resources Planning Board, June, 1943. The report is available through the Superintendent of Documents, Government Printing Office, Washington, D. C., for 50 cents.

FREDERICK G. CLAPP, consulting geologist of New York, died at Chickasha, Oklahoma, February 18, at the age of 64 years. He had recently returned from Turkey, where he was a consulting specialist on petroleum for the Republic of Turkey.

EDWARD O. ULRICH, honorary member of the Association, died on February 22, at the age of 87 years. He had been with the U. S. Geological Survey, Washington, D. C., since 1897.

ROY E. DICKERSON, for many years with the Atlantic Refining Company, Philadelphia, and recently specialist petroleum analyst in the Foreign Division of the Foreign Economic Administration, Washington, D. C., died on February 25, at the age of 66 years.

CURTIS HALL MONTGOMERY, petroleum engineer with the Continental Oil Company, Bakersfield, California, died on February 22.

#### DISTINGUISHED LECTURE

GEORGE S. HUME, geologist for the Oil Controller of Canada, discussed "Petroleum Developments and Prospects in Western Canada" before the affiliated societies in February under the auspices of the Distinguished Lecture Committee. His talk was well illustrated with projected maps and photographs, and presented a clear picture of the possibilities of this vast area.

In anticipation of this lecture tour, Dr. Hume prepared a paper entitled "Petroleum Geology of Canada" which was published as *Bulletin 98* of the Geological Survey of Canada and distributed at the meetings. This 64-page bulletin presents a summary of the petroleum geology of the Dominion, with clarifying areal maps and sections, and containing a bibliography of the latest Survey publications and maps on western Canada. It is available upon application to the Geological Survey, Ottawa, Canada.

Dr. Hume appeared before the following societies.

- February 4 Indiana-Kentucky Geological Society at Evansville
- 7 Tulsa Geological Society at Tulsa
- 8 Kansas Geological Society at Wichita
- 9 Oklahoma City and Shawnee Geological Societies at Oklahoma City
- 10 Ardmore Geological Society at Ardmore
- 11 Dallas Petroleum Geologists at Dallas
- 14 South Texas Geological Society at San Antonio
- 15 Fort Worth Geological Society at Fort Worth
- 17 West Texas Geological Society at Midland
- 19 East Texas Geological Society at Tyler
- 21 Shreveport Geological Society at Shreveport
- 22 Houston Geological Society at Houston
- 23 South Louisiana Geological Society at Lake Charles
- 24 New Orleans Geological Society at New Orleans
- 25 Mississippi Geological Society at Jackson

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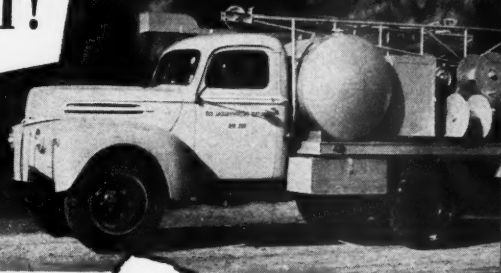
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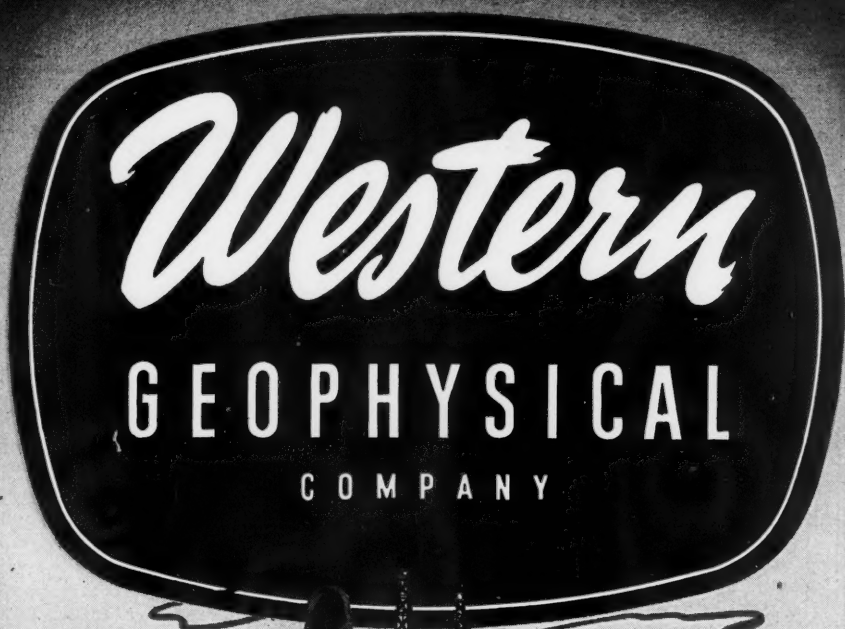
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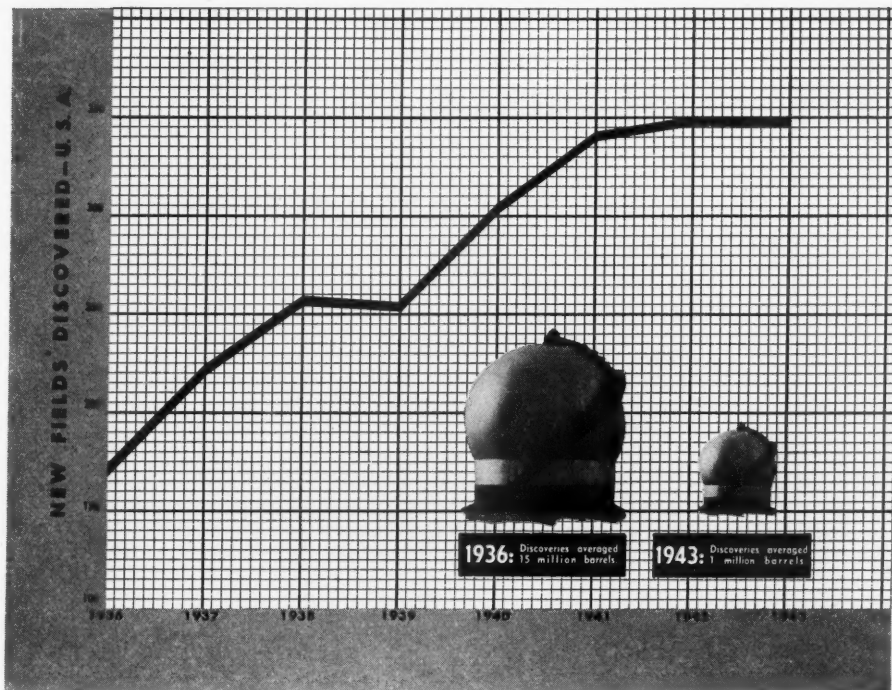
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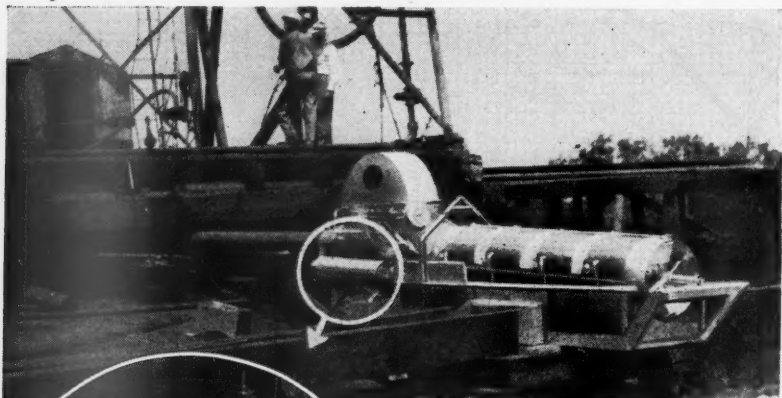
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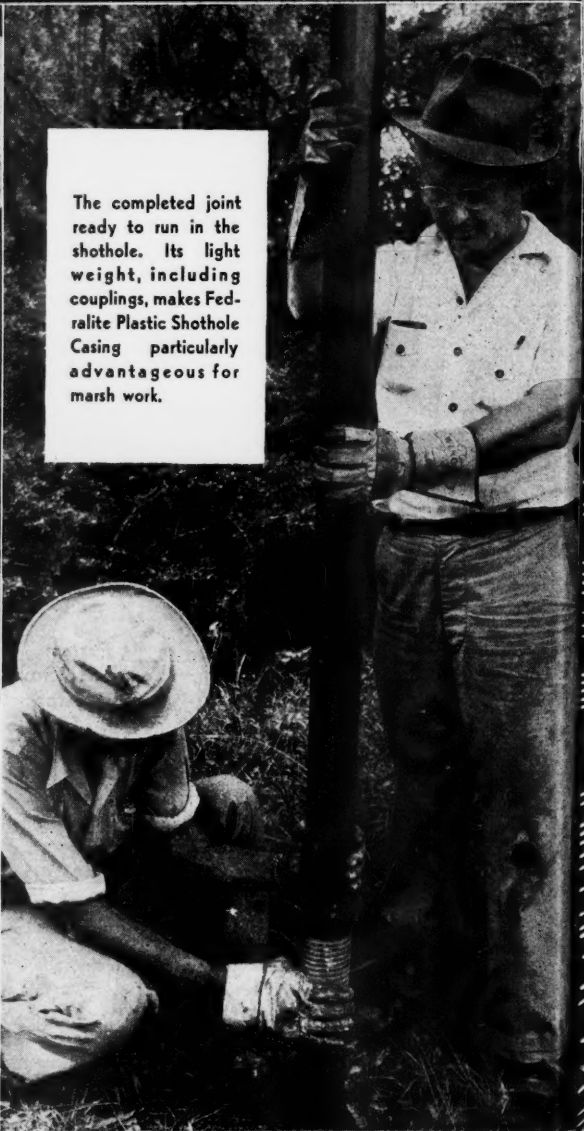
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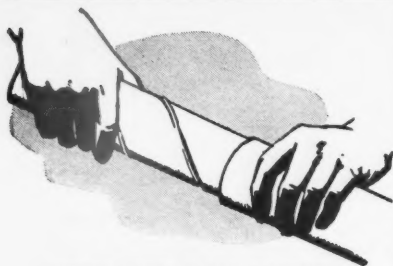
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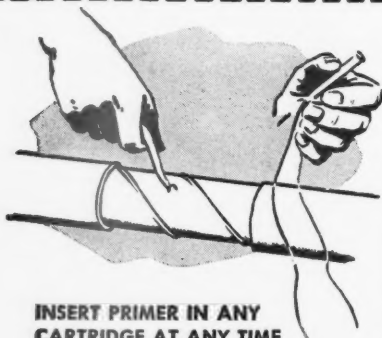


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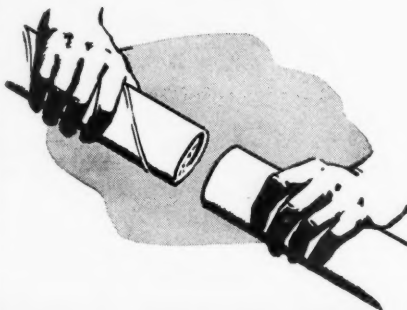


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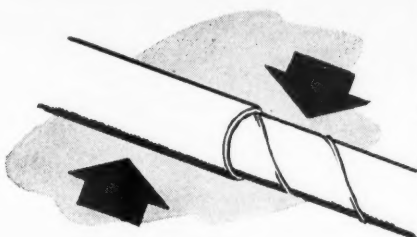
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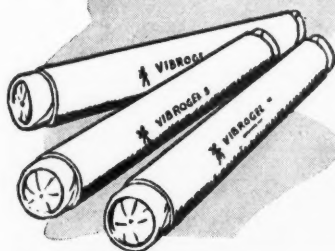
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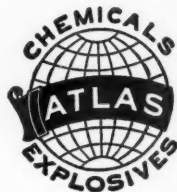
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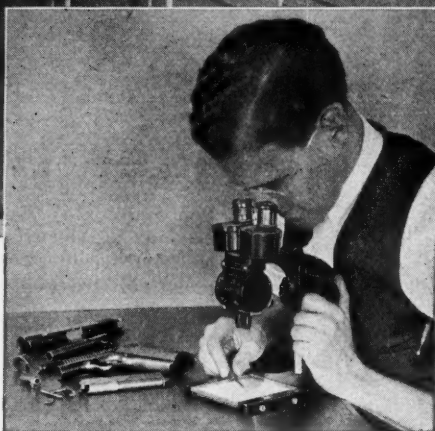
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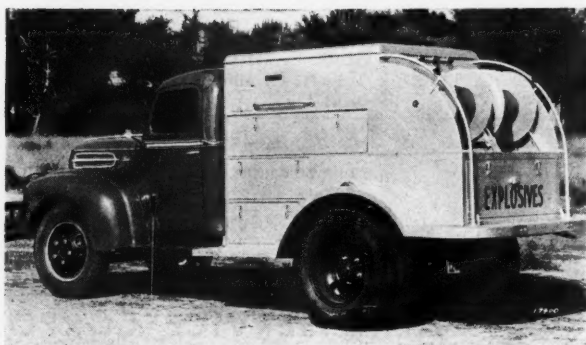
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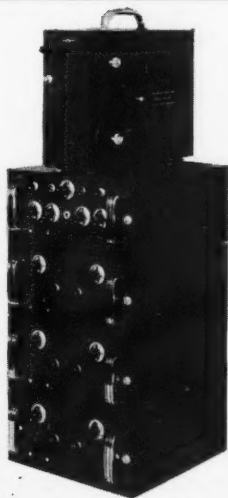
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IN 1943**

*by*

Members of the staffs of the Departments of Geology, Geophysics, and Petroleum Engineering of the Colorado School of Mines,  
under the direction of F. M. Van Tuyl

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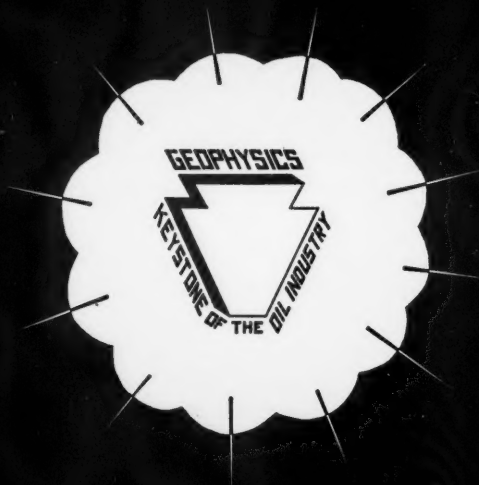
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